THE

State Agricultural College

OF THE

STATE OF COLORADO.

FIRST ANNUAL REPORT

OF THE

Agricultural Experiment Station,

1888,

FORT COLLINS, COLORADO.

DENVER:
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1888.

OFFICERS AND MEMBERS

OF THE

State Board of Agriculture.

HON. GEORGE WYMAN ..... *President.*

HON. FRANK J. ANNIS ..... *Secretary.*

HON. PETER W. BREENE, *ex officio* ..... *Treasurer.*

		Term Expires.
HON. JOHN J. RYAN	Loveland	1889
HON. ROBERT C. NISBET	Del Norte	1889
HON. WILLIAM F. WATROUS	Fort Collins	1891
HON. B. S. LAGRANGE	Greeley	1891
HON. GEORGE WYMAN	Longmont	1893
HON. R. A. SOUTHWORTH	Denver	1893
HON. CHARLES H. SMALL	Pueblo	1895
HON. FRANK J. ANNIS	Fort Collins	1895

GOVERNOR ALVA ADAMS,
PRESIDENT C. L. INGERSOLL, } *ex officio.*

UNIVERSITY OF ARIZONA

630.72
C71
1888

Letter of Transmittal.

To the Governor of Colorado:

I have the honor to transmit herewith the first annual report of the Agricultural Experiment Station conducted in connection with the State Agricultural College, as required by law.

Respectfully submitted,

FRANK J. ANNIS,

Secretary of the State Board of Agriculture.

THE STATE AGRICULTURAL COLLEGE,
FORT COLLINS, Colorado, December 31st, 1888.

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History and Organization.

An experimental department has been maintained in connection with the State Agricultural College, since its organization in the year 1879; and in February, 1888, this department was organized under and in pursuance of the provisions of an act of Congress approved March 2, 1887, under the name and style of "The Agricultural Experiment Station" Department of the State Agricultural College. The immediate management of the Station was placed under the control of an Executive Committee, consisting of three members of the State Board of Agriculture, said Board having the control and management of the State Agricultural College.

The officers of the Station consist of the Director, the Secretary and Treasurer, and a working staff representing the various departments of the experimental work.

The present organization is as follows:

Executive Committee—HON. JOHN J. RYAN, HON. W. F. WATROUS, and HON. GEORGE WYMAM.

Director—C. L. INGERSOLL.

Secretary and Treasurer—FRANK J. ANNIS.

Agriculturist—A. E. BLOUNT.

Botanist and Horticulturist—JAMES CASSIDY.

Chemist—DAVID O'BRINE.

Meteorologist and Irrigation Engineer—LOUIS G. CARPENTER.

Veterinarian—WILLIAM MCEACHRAN.

Assistant to Agriculturist—R. H. McDowell.

Assistant to Horticulturist—C. M. Brose.

Assistant to Chemist—Lewis A. Coffin.

In Charge of San Luis Valley Experiment Station—H. H. Griffin.

Superintendent Bent Agricultural Experiment Station—Frank Watrous.

Under an act of the Sixth General Assembly of the State of Colorado, provision was made for the organization of four experiment stations outside of the one at the College.

In planning for the organization and work of the Station, after due consideration, the State Board of Agriculture deemed it advisable to provide for the location of the main station at the College, and outside stations, as fast as organized, to be made auxiliary to it.

Two auxiliary stations were organized the first year; one at Del Norte, in Rio Grande County, and known as the San Luis Valley Agricultural Experiment Station; and the other at Rocky Ford, in Bent County, and known as the Bent Agricultural Experiment Station. Nothing has been done at either of these auxiliary stations in the line of experimentation, except to take observations of temperature and rainfall. Work has been done preparatory to carrying on a line of investigation at these stations next year.

The Executive Committee in charge of the Station work, provided that the Station officers and the working staff should constitute a Council to propose and outline plans of experiments to be conducted at the main and the auxiliary Stations. The plans proposed and adopted for the year 1888 are herewith appended as an introduction to the reports of the different sections of the Station.

The Executive Committee arranged to devote all of the land heretofore used in the farm and horticultural departments or the College to the work of the Experiment Station, and the implements, teams, and machinery used in those departments should become a part of the property of the Experiment Station department. No part of the fund appropriated by Congress for the organization of the Station was used to purchase the land, tools, and machines already on hand, and only such portions were used as were necessary to improve the work of the different sections and enable the Station to accomplish better results.

In arranging the salaries of the professors who are employed in both Station and College work it was provided by the State Board of Agriculture, that one-half of the salary of the officers and professors should be paid from the Station fund. All assistants and employes were paid wholly from the Station fund. Subsequently this was changed and now one-fourth of the salary is paid from the Station fund.

An itemized statement of the cash receipts and disbursements for the fiscal year, ending June 30, 1888, is submitted with this report by the Treasurer of the Station Fund, after having been duly audited and approved by the Finance Committee of the State Board of Agriculture.

The Executive Committee in charge of the Station was endowed with the authority by the Board to organize and carry forward the work of experiments at the Station; to carry out all orders in reference to the same made by the State Board of Agriculture, and to audit and approve all bills contracted for the benefit of the Station.

The Executive Committee has held monthly meetings for the purpose of examining the work of the Station, and also of auditing and approving bills.

The Committee found it necessary, under the instruction given by the State Board of Agriculture, to provide for the erection of a working laboratory, to be used in connection with the Station. The sum of $2,395 was expended for this purpose from the Station fund. The balance of the $3,000 provided by the act of Congress to be expended in the erection of buildings, was used for the construction of a building for the San Luis Valley Experiment Station.

Provision also had to be made for the equipment of the laboratory, and quite a large sum was expended for this purpose, as will be observed from the report of the Treasurer.

The reports of the different sections and sub-stations do not cover all the work done during the past year. The notes upon experiments, not included in this report, will be issued in the form of Bulletins during the next year.

OUTLINE OF EXPERIMENTS

PLANNED FOR STATION WORK

FOR THE YEAR 1888.

AGRICULTURAL SECTION.

I. Experimental ground fronting on College Avenue.

Tests for soil variation. Plats 1 to 25 inclusive.

(a) 1 to 13 (manured) to corn.

(b) 14 to 25 (unmanured) to wheat.

Each set to be treated exactly alike, as follows:

1. Same time of plowing soil.
2. Same time of preparation of soil.
3. Same time of sowing or planting.
4. Same variety of wheat on each plat.
5. Same quantity of seed on each plat.
6. Same after treatment.
   (a) Cultivation same day.
   (b) Irrigation of each set same day.
7. Harvested same day.
8. Weighed same day.

II. Between irrigating canal and railroad. Series of plats lettered A to Y inclusive. These to be kept or sown in various tame grasses and clovers, as follows:

A to I inclusive, and Q to Y inclusive, grasses.

J to P inclusive, clovers.

These to be allowed to grow and mature seed, for use in chemical test, as follows:

Four samples to be taken from each plat for analysis, in order to compare the nutritive value of the plant at different periods of growth.

1. When head first shows.
2. When head is fully opened.
3. When blossomed and about half turned.
4. When the seed is fully ripe.

III. The triangular piece north of driveway and experimental ground, sow in clover for farm use.

IV. West of railroad, 7 acres. Divide the same east and west into 14 one-half acre plats.

To be manured, and on these to be raised various products for seed distribution, as follows:

1. Cereals. (Seed).
2. Forage plants. (Seed and feed).
3. Flax. (Seed and fibre test).
4. Broom corn.
5. Sorghum. (Seed and sugar test).
6. Milletts. (Seed).
7. Beets. (Field.) (Seed and feed).
8. Legumes. (Seed and feed).
9. Carrots. (Seed and feed).
10. Pumpkins. (Seed and feed).
11. Field peas. (Seed and feed).
12. Buckwheat. (Seed).
13. Squashes. (Seed and feed).
14. Turnips. (Seed and feed).

V. North of old abandoned Emigh ditch to plant corn, Pride of the North, for seed distribution.

VI. Tile drainage.

(A) Glazed Tile.

(B) Unglazed Tile.

In old hog pasture.

VII. Area on S. W. 40 acres, to be sown to field oats. Corn stubble now, in winter rye, to be seeded down.

VIII. Land north of slough transferred to Hort. department, according to order of the Executive Committee.

IX. To plant 100 hop sets, south of barn, for test hop yard.

X. To only report tests of vitality of seeds from out door trials. (All other trials to be made in green house, or in hot beds in Hort. Dept.)

XI. To be allowed to use all or any decoctions or solutions of chemicals that may from time to time be suggested for the purpose of subduing rust, smut, mildew, or other growths deleterious to the various crops grown on the farm.

XII. To constantly improve the grains and other plants cultivated, by selection, and to try to correct nomenclature as rapidly, and as far as possible, so that none but seeds and plants true to name be sent from the college.

XIII. To otherwise conduct the farm as necessary to produce hay and pasture, as necessary for the keep of stock upon the farm.

HORTICULTURAL SECTION.

SCIENTIFIC EXPERIMENTS.

Topic 1. The observation, study, and classification of the weeds of the State.

Topic 2. The observation and study of the injur-

ious insects of the year, and the application of remedies for their destruction.

Topic 3. The fertilization and cross-fertilization of useful plants, with a view to the origination of improved varieties.

Topic 4. The observation and study of the leafage, growth; hardiness, and availability of species and varieties of fruit and forest tree growth in Colorado.

POPULAR EXPERIMENTS.

Topic 1. Experiments in the culture and curing of one acre of Havana seed-leaf tobacco, and the production of Colorado grown seed, and other varieties.

Topic 2. Continuation of experiments in the culture of peppermint and distillation.

Topic 3. Experiments in the culture of improved varieties of the potato.

Topic 4. Experiments in bee-keeping.

a. Natural versus Artificial Swarming.
b. Natural versus Artificial Comb.
c. Yield of honey from one colony from day to day during the season.
d. Advantages and disadvantages of different methods of artificial swarming.
e. Paris green and other insecticides in syrup and nucleus.

Topic 5. Sub-irrigation, small scale.

I purpose establishing a nursery of large and small fruits of new and other desirable varieties, and an arboretum in which all species likely to succeed in Colorado, will be grown for experiment and distribution.

I purpose planting an experimental pear and plum orchard of selected varieties.

I further purpose growing a large variety of the leading garden vegetables, and by selection be able to send out improved seeds of these next season.

The mere growing of so many kinds of plants for illustration consumes much time and thought, and great vigilance has to be exercised in keeping them distinct.

CHEMICAL SECTION.

To make chemical analyses as follows :

1. Fertilizers. Artesian water.
   (a) Phosphates. Water for towns and cities.
   (b) Guano. Water in other places.
   (c) Gypsums, etc.
2. Directions for sampling :
   (a) Waters.
   (b) Fertilizers.
   (c) Soils.
   (d) Food-stuffs, etc.
   (a) Rainfall.

No work performed without pay except that of public interest. The results of all analyses to be published if decided upon by the Council :

ANALYSES WITH OTHER DEPARTMENTS.

1. Water.
   (a) Rainfall.
   (b) Percloation.
2. Soils.
   (a) Normal.
   (b) Abnormal.
3. Sugar Beets, for per cent. of Sugar.
4. Sorghum, for per cent. of Sugar.
5. Grasses, for nutritive value.
6. Other Forage Plants.
7. Varied cuttings of Alfalfa, for best nutritive value for food.

METEOROLOGY AND IRRIGATION ENGINEERING SECTION.

METEOROLOGY.

I. The daily observations to include the following continuous records:

a. Direction and velocity of the wind.
b. Temperature of the air.
c. Hours of sunshine.
d. Rate and amount of rainfall.
e. Rate and amount of evaporation from water surface.
f. Pressure of the atmosphere.

II. Tri-daily observation.

a. Humidity of the air.
b. Temperature of the dew point.
c. Temperature of water surface.
d. Temperature of soil.
e. Sunshine temperature.

III. a. Terrestrial radiation—(Observation of the minimum temperature of the air near ground at night.)

In connection with these regular observations, the investigation of the following special features of our climate:

1. Influence of western winds in increasing temperature and accelerating evaportion.

2. The difference between the humidity and temperature of the air on the unirrigated plains and over irrigated fields.

3. The rate and amount of cooling of the earth and lower strata of the atmosphere at night.

SPECIAL OBSERVATIONS RELATING TO IRRIGATION.

SOIL TEMPERATURES.

I. a. To notice the extent the soil is cooled by irrigation and the subsequent evaporation.

b. Difference, if any, between temperature of soil of unirrigated and irrigated fields.

EVAPORATION.

II. a. Occasional observations of water temperatures of the river, in the canal, in the lateral, and while flowing over the irrigated field. To be taken simultaneously and in connection with the temperature of the dew point, to determine at what point the greatest loss from evaporation is experienced.

b. Observations of rate of loss from reservoirs from evaporation alone, and from evaporation and percolation combined.

c. Evaporation from soil surface.

IRRIGATION EXPERIMENTS.

DUTY OF WATER.

1. The observations on the duty of water to record the date irrigation begins and ends. The amount used each month and total volume for the year. (The portion of the record which shows the volume for each month is especially valuable for comparison with the proportionate discharge of our streams for that month,

and gives us a basis on which to estimate the value and importance of storage reservoirs to furnish water for late irrigation,

STUDY OF DISTRIBUTION FROM CANALS.

2. The object of this study is to enable the station to furnish definite information on the following topics :

a. The accuracy and efficiency of some of the measuring devices in common use.

b. To call attention to their defects, where such exist, whether of principle involved, construction or location.

The work to consist of the measurements of the form and size of these distributing works, measurement or computation of their discharges, and collection of information as to the volume intended to be delivered, and the area and kind of crop watered therefrom.

As this information is greatly needed, I wish to devote the greater portion of the vacation to its accumulation, and the experiments in water measurement necessary to verify the computations.

3. Experiments in sub-irrigation in connection with the Horticultural Department.

Director's Report.

To the Executive Committee in Charge:

SIRS—In accordance with the regulations governing departments in the College, I hereby submit my report as Director of the Experiment Station, accompanied by the reports of the various members of the Working Staff, and a summary of the invoice of Station property at the home Station and all auxiliary Stations.

Accompanying this will be found reports of:

1. Agriculturist.
2. Horticulturist and Botanist.
3. Chemist.
4. Meteorologist and Irrigation Engineer.
5. Veterinarian.
6. San Luis Valley Station.
7. Bent Agricultural Experiment Station.

This department was organized Feb. 20, 1888, at special meeting of the Board held at Del Norte, Colorado. Officers were elected and Executive Committee appointed to take charge.

The Committee met and formulated rules for the government of the Station, appointed assistants and transacted other business necessary to put the work in motion.

Closely following this, and in accordance with instructions, a Council meeting was called March 7th, at which a set of experiments was formulated for the year 1888.

This plan was submitted to the Executive Committee, and was approved by them at their next meeting.

The Council has held meetings as follows: March 7; May 9; Sept. 10; Sept. 24; Oct. 17, and Nov. 19, 1888.

The principal business transacted has been:

1. Formulating experiments.
2. Recommending lists of books for Library.
3. Adopting rules governing library.
4. Formulating plan of work for Veterinarian, and referring it to the Executive Committee.
5. Routine business; suggesting experiments for future trial and discussion of apparatus, scientific methods, etc.; also reports from time to time on the progress of the work, and the submission of material for publication in Station bulletins, followed by discussion of the same with reference to its value, from a practical as well as a scientific standpoint.

EXECUTION OF PLAN.

It becomes my duty as Director to inform the Committee and through them the Board, of the result of the season's labor, and how far the work has been carried on according to the adopted plan.

AGRICULTURAL SECTION—PROPOSED PLAN.

SECTION 1—Not according to plan, for the following reasons:

First—Soil not prepared on each set of plats at the same time.

Second—Corn plats not properly laid out after plowing. The thirteen plats were manured before plowing. After they were prepared for planting the ground was laid out in fourteen and one-half plats of unequal and smaller size, which caused a part of the manured ground to fall in the alleys, and some of the unmanured ground to be cultivated in corn, and this would of itself give quite variable results.

Third—Insufficient quantity of seed, so that on account of drouth, accidents by vermin and other reasons a very unequal stand of plants was secured.

Fourth—The seeding of wheat was on two different days. The planting of corn was on three different days, with rain intervening.

Fifth—Irrigation irregular, and some of the plats had no water—not the fault of the department.

Sixth—Plats harvested on different days.

Seventh—The products weighed, when hauled, on different days.

Eighth—Through some neglect the products of the plats from 1 to 6 inclusive were mixed, yet arbitrary and fixed weights were given to the products of these plats, and these results tabulated and reported to the Director and Board as *bona fide* results.

SECTION II—Grasses and clovers, a failure, except alfalfa, red clover, alsike and sanifoni; cause, lack of water.

SECTION III—Not sown for some reason.

SECTION IV—Sown according to plan, but faulty weighing of seed sown in some instances. Does not

affect the general result. It also lacks the saving of a proper quantity of flax for making a fiber test.

SECTION VI—Tile drainage, turned over to Horticultural section early in spring, and only unglazed tile used. Farm reports result.

SECTIONS V, VIII, IX, X, XI—All carried out according to plan, according to the best of my knowledge, except the seeding of No. 7.

HORTICULTURAL AND BOTANICAL SECTION.

SCIENTIFIC EXPERIMENTS.

Topics 1, 2, 3 and 4. Work carried on as per plan, with most of it completed. Lacks some work in Botany in study and classification of plants, which the Professor assures me will be complete by February 1, 1888, the date when a full report of the year's work of the Station must go into the hands of the Governor, according to the Hatch law.

Topics 1, 2, 3, 4 and 5. Popular experiments, all completed except the distillation of peppermint by chemical section; also analyses of potatoes for comparison of relative quantity of starch and water present. This work is now going forward.

Under (*e*) *Topic* 4, the experiment of insecticides, *i. e.*, bees, was, in my opinion, begun too late to give decisive results, and may have to be repeated next year.

The Orchards mentioned and the nursery have been planted; vegetables raised for comparison and ac-

cording to the best of my knowledge the work has been accurately performed and all errors eliminated by withholding reports whenever these have occurred.

Sub-irrigation not tried this season.

METEOROLOGICAL AND ENGINEERING SECTION.

DIVISION 1—Work carried forward with few breaks, but at a disadvantage by change of head of department twice during the season.

The testing of instruments was formally begun by Prof. L. G. Carpenter when he assumed the responsibility of the work or the department.

Topics 2 and 3 under 3, are not carried out; they relate to a comparison between the humidity and temperature of the air on irrigated fields and unirrigated plains.

Soil temperature not carried out, thermometers received too late, and have only closed comparative test of them preparatory to work of next year.

Evaporation experiments from reservoirs not carried out; also from soil surface.

Topics 1, 2 and 3 under Duty of Water, all a failure from various causes.

CHEMICAL SECTION.

Began operations about Oct. 1st, at which time the laboratory was completed so as to admit of continuous work.

Analyses have been made of various substances, as follows:

1. Artesian water from Alamosa, Colo. Water from Fort Collins water work.
2. Cheese.
3. Irrigating water with sediment taken from

Clear Creek and canals at points on the plains.

4. Insecticides, 4 samples.
5. Apples, the blossoms and small setting fruit had been sprayed with Paris green.
6. Sorghum, raised on College farm, 26 samples.
7. Alfalfa, 9 samples.
8. Bran from Roller Process Mill.
9. Sugar beets, 4 samples.
10. Potatoes.

There remain yet samples of varieties of tobacco to analyze and peppermint distillation to make, of work laid out by the Council.

The study of the fertilizers offered for sale in this State may soon be profitably begun, for the benefit of those who are to use them next year.

Soil analyses can come later, and work performed in this line when other work is not in progress.

VETERINARY SECTION.

The Veterinarian has submitted to the Council a plan for a beginning of work in his department. As this involves the expenditure of money, of which there did not seem to be the necessary funds, the work has necessarily been delayed.

The reports of the auxiliary stations are brief and comprehensive, and serve to show the committee the possibilities of these places.

In conclusion, let me say that I have endeavored to set forth the facts in regard to the Experiment Station, over which I have had supervision, as they have come to my knowledge, without fear or favor. This being the

initial year, and an organization being effected so late, has, in a measure, affected the results.

One bulletin has been published, dated October, containing matter in apiary report, and was to have included directions, etc., from each section. By carelessness on my part the matter prepared by the Chemical Section was left out. This can be printed in the next bulletin without serious loss to any one.

There is a mass of matter from the various sections which will be submitted and passed upon soon by the Council, after which such parts as are thought advisable will be recommended to you for publication in future bulletins, and all to be included in the annual report to be sent to the Governor February 1st, 1889.

I have the honor to be,

Very respectfully,

Your obedient servant,

C. L. INGERSOLL,

Director.

Report of the Agriculturist.

To the Executive Committee in Charge:

SIRS—I hereby submit my report as Agriculturist in the Experiment Station Department.

I. Tests for Soil Variation.

This experiment was planned and introduced by the Director, to show, for a series of years, the variation of soil in different portions of the same field for the purpose of future accurate tests of varieties and fertilizers or other peculiar treatment.

The crops to be raised were the "Pride of the North" corn on 13 manured quarter acre plants, and the "Amethyst" wheat on 12 plats of the same size, unmanured. For four years previous these plats had been occupied by various crops, sown and planted in such order that a valuable system of rotation was observed. The crops raised on these plats last year were:

1. Mustard and Fenngreek.
2. Canary Grass.
3. German Millet.
4. Beans and peas.
5. Sorghum.
6. Lentils, Vetches and Lupins.
7. Corn.
8. Rutabagas.
9. Broom Corn.
10. Corn.
11. Wheat, Oats and Barley.

12. Flax.
13. Buckwheat.
14. Field Peas.
15. Squashes.
16. Wheat.
17. Pumpkins.
18. Wheat.
19. Oats.
20. Rye.
21. Carrots and parsnips.
22. Barley.
23. Beets.
24. Beets.
25. Sugar Corn.

Location—The field used for this experiment in soil variation is located in the Southeast corner of the College farm, on College avenue, consisting of 25 quarter acre plats running East and West, 2 rods wide, and 20 long, and numbered from the North to the South on the West side.

Preparation of Soil and Planting.—During the fall the entire field was plowed east and west, and in the winter stable manure was hauled and spread upon plats from 1 to 13 inclusive—about two loads per plat. But little snow or rain having fallen during the winter, these plats were very cloddy, dry and hard, which necessitated a thorough pulverizing. This was done April 24, by a clod crusher made for the purpose, and then harrowed. The thirteen plats were furrowed off from north to south, marked off east and west, and planted May 1, 2, and 3 to one and one-fourth pounds of improved seed corn per plat.

Owing to the extreme dryness of the soil and the chaffy character of manure applied, the corn germinated very indifferently, notwithstanding the deep furrows in which it was planted. Many hills failed to come up

until sometime after the rains. All the seed that germinated at first was up through the soil May 19, 21, and 22.

Cultivation and Irrigation.—The corn was cultivated both ways with a five-tooth cultivator.

First—Cultivation was done north and south June 6.
Second—Cultivation was done east and west June 8.
Third—Cultivation was done north and south June 23.
Fourth—Cultivation was done east and west July 12.
Fifth—Cultivation was done north and south August 3.

One hoeing only to cut the weeds August 2.

July 20 the water was let on, and about the time it extended over half the plats, running across them from south to north, orders came from the superintendent of the ditch "that all water except for domestic purposes must be stopped." This put an end to irrigation of the corn—not half of it was irrigated.

Harvesting.—The entire crop of the thirteen plats was cut, weighed, hauled, and shocked at the barn September 24, 25, and 26.

After drying until November, it was husked out and again weighed, both corn in the ear and fodder separately, with the following results:

Plat No.	Green Stalks and Corn.	Dry Fodder.	Corn in Ear.
	lbs.	lbs.	lbs.
1.	1,090	338½	286
2.	1,000	419½	577
3.	910	380½	279
4.	800	266½	236½
5.	725	291½	312
6.	700	236½	208½
7.	740	335	242
8.	770	347½	226½
9.	965	462	261½
10.	1,050	457	285
11.	1,115	323	268
12.	830	364	140½
13.	845	280	204
	11,540	4,500½	3,376½

This shows that 3,663 lbs., or about 67 per cent. of water had dried out during that time, and that the dried stalks or fodder weighed about 75 per cent. more than the corn in the ear.

THE WHEAT PLATS.

Plats 14 to 25 inclusive were thoroughly pulverized and harrowed March 13th, preparatory to sowing wheat to test soil variation. March 20, plats 25 and 24 were sown in a snow storm, which became so furious that the remaining 10 plats could not be sown until the next day. Ten pounds of improved seed were sown on each, about two inches deep. No cultivation at any time was given the crop. The seed on plats 14, 15, 16 and 17 was well up April 11; that on plats 18, 19, 20, 22, 23 and 24, April 19, and that on plats 21 and 25, April 7, making the time of germination 18, 20 and 22 days. Wheat, rye and barley germinate at as low a temperature as 37 degrees, and very rapidly at 45 degrees. The reason of this tardy germination was not cold, but dry soil.

June 15, plats 14, 15 and 16 were irrigated; 17, 18, 19 and 20 the 16th, and the remainder on the 18th of June. It was impossible to apply the water to the entire 12 plats in one day, as is stipulated in the schedule, inasmuch as the flow of water was small, and consequently too slow to complete the work in that time.

The second irrigation began July 5th, when plats 14, 15, and a part of 16 were irrigated ; on the 6th the remainder of 16, all of 17 and 18, and a part of 19 and 20 were wet ; on the 7th the rest of 19 and 20 was finished. On the 9th and 10th, the plats 21, 22, 23, 24 and 25 were completed.

Owing to a flooding by an overflow of water last fall, plat 25 was partially irrigated—about half of it—the result of which was, that the wheat on the irrigated part ripened nine days earlier than any other, and it was

much plumper and of a lighter color. It was cut and shocked August 2.

August 16, plats 16, 18, 20, 21 and 23 were cut, and August 13, the remaining plats all shocked in the field. After 11 and 12 days drying the grain was weighed, hauled and stacked at the barn, where it remained until September 25, when threshed, each plat separately and very carefully, with the following results :

Plat No.	Weight when Stacked.	Weight of Straw.	Weight of Grain.
14.	635	339	296
15.	725	383	343
16.	575	276½	298½
17.	835	476½	358½
18.	390	190	200
19.	700	410	290
20.	590	296	294
21.	775	424	351
22.	575	286½	288½
23.	743	375½	359½
24.	850	488	362
25.	885	488½	396½
	8,270	4,432½	3,837½

Machine measure, 3,480, or 58 bu.
By weight, 38,37½, 3 or 62.9 bu.

WATER.

In the absence of the water guage it is impossible to make any very definite estimate of the amount of water in inches, that was applied to each of the wheat plats. It can, however, be very safely stated that the amount was much less than any previous season. The small quantity applied this season has proved one thing, viz: That too much is generally used on all crops. It makes too much straw, stalk or vine, thereby sacrificing the seed in quality. Never has such heavy and fine looking grain been raised on the farm, owing to the dry season and the very small quantity of water applied.

II. Between the irrigating ditch and railroad, the plats from A to Z were sown to the clovers and grasses.

The stipulations laid down in the schedule and the conditions could not be carried out on account of the shortage of water, except in the single case of the alfalfa. So far as possible, however, they were carried on, the report of which is as follows :

These plats are 2 rods by 6, containing 12 square rods. They were put into shape to be sown early in the spring, and were all sown to seed reputed to be true to name and genuine.

Plat A was sown May 25 to 20 clovers and grasses, the seed of which was sent in very small quantities from Australia by Mr. Farrer, of New South Wales. They are all highly recommended as fine for stock food, and would endure dry weather.

1. Sorghum Plumasum.
2. Unknown Grass.
3. Unknown Grass.
4. Unknown Grass.
5. Andropogon Montanus.
6. Festuca Brillarderie.
7. Kangaroo Grass.
8. Unknown Grass.
9. Blue Grass.
10. Kangaroo Puss Grass.
11. Wild Carrot.
12. Nardoo.
13. Trigonella Clover.
14. Andropogon Australis.
15. Andropogon Auntatus.
16. Eragrostis Abyssinca (Teff).
17. Hickory Seeds.
18. 100 headed Kale.
19. Unknown Grass.
20. Black Media.

On plat B were sown one row each 1, Leosinte ; 2, Helopus ; 3, Colo. Blue stem ; 4, Panicum palmere ; 5,

Koeleria and Etonia ; 6, Panicum Lexanum ; 7, Snail clover ; 8, Media stativa ; 9, Bunch grass ; 10, Honey clover ; 11, Crimson clover ; 12, Sainfoin, or Espersette.

Nos. 1, 7, 9, and 11 failed to ripen seed.

Nos. 2, 3, 4, 5, 6, and 8 failed to germinate.

Nos. 10 and 12 produced a fair amount of very nice seed.

Plat C was sown May 12 to yellow trefoil and plat D to spurry, both of which failed to come up.

Plat E was sown to Bokhara, a hardy biennial. It made a good stand and will go to seed next year.

Japan clover on plat F was an entire failure, not from poor seed but from the want of moisture in the soil.

A pound of burr clover seed was sown on plat G and about a hundred seeds came up, producing nearly a pound of burrs.

On plat H Texan blue grass was sown in May. The seed is light and chaffy, requiring very moist land to germinate it. It entirely failed.

English rye grass on plat I met with the same fate and for the same reasons, and on plat J Wood meadow grass, which failed to germinate.

On plat K, in July, 1887, red clover was successfully sown and grown, making a fair crop of hay. This year it made some seed and hay—not enough to furnish samples for analysis.

The White clover on plat L, sown last year at the same time, almost all killed out this season.

The Alsike on plat M has held its own, making a small amount of seed and hay.

Mammoth, or sapling clover, sown last year in July on plat N, has done fully as well as could be expected, it having had no water.

The alfalfa on plat O made a good crop, notwithstanding the drawback of having no water. It is the

only clover or grass that grew sufficiently to furnish samples for analysis, as per instructions in the schedule. Four cuttings were made:

1st. When the head first shows.

2d. When the head fully opened.

3d. When blossomed and about half turned.

4th. When the seed was fully ripe, well dried, weighed and taken to the laboratory in good order.

On plat P sanfoin or espersette was sown last year. This plat is dry, gravelly and very poor. The seed, notwithstanding, secured a good stand, and has held its own under as trying conditions as any plant on the farm. It is a forage plant that certainly commends itself for hardiness, and is worthy of further and more extensive trials.

On plats Q, R, S, T, U, V, W and Y were sown this year the following tame grasses, none of which made even a partial stand, on account of having no moisture in the soil and no water for irrigation:

Meadow foxtail.
Reseue grass.
Rhode Island bent.
Meadow soft grass.
Meadow brome.
Yellow oat.
Tall meadow oat.
Hard fescue.
Sheep's fescue.
Tall fescue.
Meadow fescue.
Various leaved fescue.
Italian rye grass.
Red top grass.
Orchard grass.

Kentucky blue grass and timothy on the last plat made only a partial crop, not enough to furnish samples for analysis.

III. The irregular piece of land north of the driveway could not be sown to clover as was intended, there being no water and not enough moisture in the soil even to plow it. After the rains, however, it was turned in August and a different disposition made of it.

IV. West of the railroad the strip of land was divided, after having been plowed north and south, into 15½ acre plats, with spaces 6 feet wide between.

Having but one team, but a few loads of manure could be put upon these plats as was directed. That was put upon 14 and 15. The remainder of the plats have never had any fertilizer or manure put upon them since the native sod was broken. These plats are numbered on the west end.

On plat 1 were planted milo maize, which has proved a very productive and valuable forage; kaffir corn, another fine and most excellent fodder plant; Indian millet; leosinte, which is considered one of the best and most productive forage plants grown, but which does not ripen in this climate; pearl millet, valuable in the same respects; millet grass and thirty-three varieties of sorghum, the seed of which the Director procured in very small quantities from Kansas. Only twelve of them came labelled, the rest unnamed. These sorghums were all planted May 12, under quite unfavorable conditions of soil, it being dry and lumpy. Of these the first to mature seed was the Early Tennessee (No. 12). It came into bloom in August, and all the rest except Nos. 1, 9, 18, 21, 22, 23, 25 and 32 followed. October 18th, twenty-five stalks were cut of each kind, stripped and sent to the chemist for analysis. It is quite

certain that these varieties of sorghum will mature in our soils under ordinary circumstances. While sorghum generally can endure dry weather, it will not germinate readily in dry and cold clay soils. When the soil is warm and moist, germination is rapid, and the growth depends much on that.

On plat 2, 34 kinds of stock and sugar beets were planted the second week in May. Not only did the dry condition of the soil retard and prevent germination, but those that came up were entirely destroyed by the web worm. On the 16th of June, the whole plat was resown, again proving almost a failure.

On plat 3, 6 varieties of sorghum were planted in quantity May 9. The seed has been raised and improved on the grounds for several years. This year the Chinese, Early Amber, Link's Hybrid, Early Orange and Amber ripened without water, but the Honduras failed even to make heads. Seeds of all the sorghums were hand-picked, and sample of each sent to the greenhouse to be tested for vitality.

On plat 4, 1½ pounds of very choice German millet seed was sown on May 22, with every condition of soil and climate seemingly favorable. Germination was quick, and the prospect good for a large crop, but hot suns, want of water and the pigeon grass entirely paralyzed and destroyed it.

On plat 5, 9½ pounds silverhull buckwheat was drilled June 1. Like the millet it failed, being completely smothered by the bindweed, pigeon grass and web worm. After the disappearance of the web worm it made an effort and finally produced 61½ pounds of very nice seed.

Buckwheat and millet require a great amount of water during the time they are making rapid growth. When checked they fail.

On plat 6, 15 pounds of mammoth rye was drilled

in, April 26, under very unfavorable conditions of soil, it being dry, hard and cloddy. It came up, however, and looked well May 9, but failed to stool. The yield was but 90½ pounds.

Plat 7 was laid off in 300 hills for 28 varieties f squashes used for stock. Great care had been taken in preparing them for the seed, all being filled with sediment from the lake. They were planted June 2 and made a fine start. The product was but three loads of medium-sized squashes.

The 13 varieties of pumpkins planted the same day and under the same circumstances on plat 12, made 3½ loads of very fair specimens.

The 15 pounds of fine barley sown on plat 8, April 26, resulted in anything but success. The yield was only pounds of fine seed.

May 24, 14 pounds of European flax seed were sown on plat 9. The seed came up well and looked well until in the midst of its rapid growth the hot weather and dry soil checked it, so badly injuring it that only 62 pounds of seed were harvested.

On plats 10 and 11 turnips of various kinds were sown early—June 1. So poor a stand was made as to necessitate resowing, which was done quite too late (July 12) to make a crop of large turnips. The yield was 2¾ tons.

April 4, on plat 13, 36 pounds of Canada field peas were drilled in, cultivated and irrigated once. Much of the crop was damaged by the web worm. September 9 they were cut with the mower, hauled up and threshed. They yielded 463 pounds—about 15½ bushels per acre.

Plat 14 was sown early in May to carrots, parsnips and Southern cow peas. Not a carrot or parsnip germinated, but the peas made a fine crop of vines and but few peas on account of the short season. Rutabages were sown in place of carrots and parsnips, making quite a crop of small turnips, 685 pounds.

On plat 15, 5 kinds of broom corn were planted May 10. The seed of the Evergreen and Japanese produced mere tassels with short and worthless brush. The California, Golden, Dwarf, and the Early Long Rush Evergreen made some very fine and long brush. The seed was cut October 16 and saved separately.

The triangular piece of land extending from the railroad back to the old sheds was plowed, furrowed off and planted, May 10. The corn germinated well and presented a fine prospect until it was a foot high when it tasseled, stopped growing and dried up for want of water. It was cut for fodder having made no grain at all.

VI. Tile draining.

The tile bought for this was turned over to the Horticultural Department, inasmuch as the trenches were already dug in it. It was laid on an acre by the College, in the orchard, on the south side of the open ditch. So far it is reported as working admirably.

VII. The plat of old land on the southwest 40, containing 4 acres was prepared and on the 31st of March was sown to 133 pounds oats, irrigated June 30, cut July 15, and hauled, weighed and attacked at the barn August 1. Having had but one irrigation, they ripened early and well, and are very heavy and fine, as is shown in the following statement :

Weight when stacked, 12,105 pounds.
Weight of grain when threshed, 5,600 pounds.
Weight of straw when threshed, 6,505 pounds.
Measure at machine, 126½ bushels.
Measure by weight, 175 bushels.

The oats made by weight 48½ bushels more than by measure at the machine.

IX. Northeast of the barn, by the lake, 102 hop vines were set out. Fourteen are staminate and 88

pistillate. All the former grew well and all are alive. Thirty-seven of the latter failed to make any growth. During the month of June they were irrigated twice and were making a very rapid growth, when they were checked by cutting off the water. Only 5 bore hops.

X. Noticed in another part of this report.

XI. Paris green on the web worm, and kerosene emulsion for lice on sorghum, were used most effectively Corn soaked in a solution of water and strychnine proved a sure remedy for the depredations of the little ground squirrels.

XI. and XII. On a strip of clover sod, west of the drive designated plat 50, the following seeds have been tested for vitality, quality and quantity, nomenclature, resistance of parasitic fungi and insects, amount of seed per acre, time of ripening.

These were planted in rows 50 feet long from east to west, 10 grains in each row. They were cultivated by hoe and irrigated partially twice. In the list of wheats the intervening numbers omitted show those heretofore thrown out as being found unworthy of further trial. The seed of many of the wheats, oats and barley, was sent us from foreign countries. Some of these to be crossed on ours, and otherwise improved. The following is the list of grains and seeds on this plat:

260 varieties of wheat.
52 varieties of oats.
34 varieties of barley.
12 varieties of rye.
15 varieties of corn.
42 varieties of peas.
3 varieties of beans.
5 varieties of buckwheat.

8 varieties of millet.

6 varieties of flax.

1 each of lentils, lupins, vetches, hop seed, sunflower, hemp, canary, mustard, chuna, fenngreek, chickpea, Aztec coffee.

In the list of wheats, oats and barley:

Column No. 1, shows number seeds germinating.

Column No. 2, shows yield of grain.

Column No. 3, shows yield of straw.

Column No. 4, shows days in ripening.

In harvesting these grains, the straw was cut a foot high, hence the small amount noticed in the table.

The wheats from 1 to 216 have been tested and improved by selection, and a few by crossing for 3 years and more. Most of them have proved successful for field culture and for the farmer, and in their analysis at Washington, most of them were found to be fine milling wheats. These marked with a star are winter wheats, and absolutely refused this year to be converted to spring varieties. For seasons past some of them have fully ripened in the spring.

Among those obtained or received from foreign countries within a year or two, are a few that appear very promising. Among the last 36 in the list are 24 that are truly the finest varieties ever received from other countries. They came from Australia, India, Austria, Scotland and Russia.

The vitality of the wheats is some over 80 per cent. Considering the very dry soil in which they were planted and the entire absence of moisture, it is a wonder that half the seed germinated.

The oats show a better record, on account of rains that fell awhile before they were planted. Their vitality is a fraction over 90 per cent. The barley also averaged over 90 per cent.

We have no exact method of determining the quality of wheat, except in the laboratory and mill. But a comparison of the grain raised this year with the same raised several years ago and analyzed at Washington, the former is much heavier and appears to be of better quality. If weight is a reliable test in the mill the wheat this year and oats and barley, are of better quality than ever before.

Of the quantity per 100 grains or acre the table shows a decided falling off.

Three and one-third pounds of wheat from 100 grains planted (two of which did not germinate) is the highest yield made by any variety on 54 square feet of land. One pound, 12 ounces, the highest made by the oats (7 grains having failed to come up), and 2 pounds, 2 ounces the highest of the barley from 94 grains of the 100 planted.

The wheats commenced heading and blooming June 20; the oats June 18, and the barley June 24. The time between blooming and ripening varies in the spring wheats from 29 to 46 days; in the oats 24 to 35 days, and in the barley 30 to 44 days.

NOMENCLATURE.

The same grain often comes to us under different names and it is very difficult in one or two seasons sometimes to determine and apply the right one—it is often an impossibility, in fact; not that wheat, oats, and barley mix readily, and by the agency of insects, the winds and force of gravity (because this is rarely the case) but climate and soil and irrigation here make such radical changes that the same grain raised in rainy sections and here look no more alike, and do not even grow alike or head alike.

In the list of wheats the El Dorado and Egyptian are the same, ; the Soft Australian and Hard Australian

the same ; the Golden Globe, Mediteranean Spring and China Tea are the same ; the Prussian and Golden Drop are identical ; Triticum, Samara, Durim, and Ames are the same ; the Rural, Peerless, and Silley's No. 1 are in many respects alike.

Among the oats, the Australian, White Eureka, Welcome, Clydesdale, Racehorse, Burpie's Welcome and Waterloo are apparently the same oat, as a careful study of their habits and characteristics and botanical analysis have shown. The Chinese Hulless and Pringle's Hulless seem to be the same.

Of the different kinds of barley raised on these grounds for several years, the Smooth Hulless and Del Norte are the same, Winnepeg No. 1 and Phoenix are alike, Annat and Sibley's Purple are identical, Indian No. 4 and 4-rowed Spring, the same.

No parasitic fungi have appeared on a single variety or even a single stalk of wheat, oats, barley or rye this season, and no noxious insects have molested or even been seen on them. Smut and rust have been reported in no section and as for the Hessian fly, chinch bug and wheat midge, they have never interfered with small grains in our State.

A careful study of the tables shows how much seed farmers lose by sowing 90 or even 60 pounds per acre; it shows also how much of the seed sown fails to germinate; how long the crops are maturing and the time from heading to ripening.

This year in March and April 100 grains each of carefully selected seed were sown upon 1-5 of a square rod. Where they came up a record was made of the number germinating, which shows the per cent. of loss.

Now, if 100 grains of wheat, oats, barley or rye plant that amount of land and produce such a season as this, at the rate of 45 bushels of wheat per acre, 43 of oats and 36 of barley, with but one irrigation, where

does the half a pound of seed per square rod the farmer sows, go to? Does it all come up and grow? By no means. More than half is lost in the germination by absolute interference of the seed in the soil.

Further experiments on this plat have been made by way of improving and producing for distribution the seeds of these plants mentioned in the above list.

XIII. The regular farm work in making and caring for the general crops for stock has been carried on upon the experimental plan, an outline of which is given below.

Alfalfa. None of the grasses or clovers had water this year, hence the small yields.

The north plat of alfalfa, containing 1.9 acres, made four cuttings:

1st cutting, 7,365 lbs.
2d cutting, 4,475 lbs.
3d cutting, 3,050 lbs.
4th cutting, 2,900 lbs.—8.7 tons, or 4.68 per acre.

The south plat of 4.8 acres made three cuttings:

1st cutting, 17,595 lbs.
2d cutting, 11,790 lbs.
3d cutting, 7,435 lbs.—19.41 tons, or 4.04 per acre.

Southwest plat of 7.9 acres made two cuttings:

1st cutting, 15,974 lbs.
2d cutting, 13,995 lbs.—14.98 tons, or 1.89 per acre.

Hill plat of three-quarters acre made three cuttings:

1st cutting, 3,025 lbs.
2d cutting, 1,725 lbs.
3d cutting, 1,025 lbs.—2.88 tons, or 3.84 per acre.

Clover, east and north-east of barn, two cuttings:

1st cutting, 19,415 lbs.
2d cutting, 14,415 lbs.—16 91 tons.

Clover in lake and on ditches, one cutting, 6,931 lbs.
Meadow grass, 3,780 lbs.
Timothy and native grass, 10,833 lbs.
10.77 tons.
Total, 73.85 tons.

Over 45 tons of this hay is in the barn. The meadow hay, first crop of clover, and some that was wet, are stacked out doors.

Corn—On the plat containing 1.85 acres by the lake, Pride of the North corn was planted in May for seed and feed. It failed to make either much of corn or fodder, owing to the poor soil and want of water.

On the open ditch from the railroad round to the flume a narrow strip of sod containing 4.2 acres was turned over in April, planted to corn, cultivated twice, but not irrigated. The crop was cut before frost and stacked at the barn. The yield of corn was about bushels and loads of fodder.

The beets, carrots, parsnips and turnips saved for feed last year were set out last year by the hops. Of the 67 set out, only 21 of the beets went to seed, the rest and the carrots, parsnips and turnips being destroyed by the web worm and dry weather.

On the same plat 14 varieties of field, sugar, pop and flour corn were planted on trial. They came from different sources to be tested on the College farm. They were planted early and carefully cultivated. Some of them failed to make ear on account of the shortness of our seasons. The others made some seed.

Respectfully submitted,

A. E. BLOUNT,

Agriculturist.

WHEAT.

Number.....	NAME.	Number of Grains Germinated.....	Yield of Grain.....	Yield of Straw.....	Time in Days Ripening.....
1	Minnesota Fife	88	2.2	1.12½	96
2	White Fife	72	1.8	1.½	96
3	Sherman	76	1.9	1.1	99
4	White Russian	80	2.	1.1½	95
5	Odessa	85	2.	.14	103
6	Eldorado	44	.12	.6	98
7	Soft Australian	84	1.12	1.13	99
8	Defiance	94	1.2	1.½	98
9	Champlain	89	1.	1.6½	96
10	Oregon Club	64	1.8	1.3	97
11	Hard Australian	90	1.14	2.	97
12	Sonora	70	1.10	.8½	92
13	White Mexican	63	1.12½	1.	98
14	Improved Fife	72	1.6	1.	102
15	Russian	60	1.12	1.1	98
16	Brooks	77	1.8	.1½	102
17	Rio Grande	60	1.½	1.	97
18	Canada Club	78	1.8	1.1	95
19	Judkin	72	1.1	1.	96
20	Lost Nation	72	1.2	1.3	97
21	Touzelle	84	1.	1.9½	95
22	Australian Club	56	1.10	.12	94
23	Golden Globe	59	1.	1.	97
24	Mediterranean Spring	80	1.6	1.	97
25	China Tea	59	1.2	.15	97
26	Chili	75	1.12	1.3	95
27	China Spring	42	1.8	.14	97

WHEAT—*Continued.*

Number	NAME.	*Number of Grains Germinated*	*Yield of Grain*	*Yield of Straw*	*Time in Days Ripening*
28	Egyptian	56	1.	.11	97
29	Saxon Fife	73	1.2	.15	97
30	Dominion	77	1.2	1.	97
31	Prussian	82	1.4	1.2	92
32	Golden Drop	80	2.	1.	94
33	Pringle's No. 6	68	1.	1.3	96
34	Pringle's No. 4	77	2.	.15½	98
35	Pringle's No. 5	53	1.8	.13	96
36	Winter Australian	62	2.8	.13	98
37	*Clawson	89	.....	.....	.....
38	*Fultz	60	.....	.....	.....
39	Midge Proof	57	2.	1.8	98
40	*Centennial	64	.2	.4	122
41	Hedgerow	53	1.14	1.11	106
42	Granite	24	1.	.7	98
43	Italian	44	1.8	.6	98
44	N. Y. Flint	39	2.	.9	98
45	*Bald Baltic	84	.....	.....	.....
46	*Illinois First Premium	85	.....	.....	.....
47	*Illinois Second Premium	85	.....	.....	.....
48	*Red Orange	95	.....	.....	.....
49	*Med. Winter	94	.....	.....	.....
50	*Purkey	94	.....	.....	.....
51	Hybrid No. 10	75	2.4	1.7	96
52	Golden Chaff	94	1.14	1.10	96
53	Med. Red Chaff	90	3.3	1.2	98
54	Velvet Chaff	83	2.4	1.4	98
56	Sardonyx	87	2.2	1.3	112
57	Amethyst	92	2.	.15	98
58	Ruby	74	2.2	1.4	109

WHEAT—*Continued.*

Number	NAME.	*Number of Grains Germinated*	*Yield of Grain*	*Yield of Straw*	*Time in Days Ripening*
59	Jasper	89	3.	1.8	97
60	Sapphire	59	1.8	1.1	96
61	Chalcedony	84	2.5	1.4	98
62	Emerald	65	1.6	.7	102
63	Black Chaff	87	1.10	1.6	98
64	Cretan	76	1.6	.12	98
65	Andriola Red	83	1.9	1.10	95
66	Andriola Amber	70	2.2	1.	97
67	Purple Chaff	65	1.10	1.10	98
68	Boughton	68	1.8	.13	98
69	Hedgerow	79	3.	1.6	97
70	Anantka	66	1.	.5	98
71	Fountain	89	3.	1.12	98
72	Palestina	80	1.14	.14	109
73	W. Chaff Smooth	71	2.7	1.	95
74	W. Chaff Bearded	74	2.2	1.4	95
75	Red Chaff	75	2.2	1.15	95
76	Perfection	95	3.10	1.8	97
77	German Fife	89	2.6	1.8	96
78	Mammoth	91	2.	2.1	96
79	Triticum	84	2.2	1.6	94
80	Samara	92	1.12	1.14	94
81	Durum	80	1.10	1.5	96
82	Saratoo	84	1.10	1.8	96
83	Ames	89	2.	1.15	95
84	Moscow	89	1.8	1.6	96
85	Knapp	84	1.7	1.	96
86	Scotch Fife	96	1.9	1.	96
87	Doty	90	2.	1.	92
88	Meekins	78	2.	.11	95

WHEAT—*Continued.*

Number	NAME.	*Number of Grains Germinated*	*Yield of Grain*	*Yield of Straw*	*Time in Days Ripening*
89	W. Michigan	79	1.8	1.2	98
90	*Rickenbrode	82	.....	.....	.....
92	*Heige's Prolific	90	.....	.....	.....
94	*Rice	87	.....	.....	.....
95	*Swamp	88	.....	.....	.....
96	*Gold Medal	89	.....	.....	.....
97	*Glass	88	.....	.....	.....
98	*German Amber	96	.....	.....	.....
99	*Wysor	89	.....	.....	.....
100	Dallas	75	2.4	1.1	102
101	*Champion	77	.2	.1	103
102	* inlay	77	.....	.....	.....
103	*Lemon	86	.....	.....	.....
104	*McGee's Red	97	.....	.....	.....
105	*Bennett	63	.....	.....	.....
110	Propoe	87	2.10	2.2	98
111	*Small Frame	87	.....	.....	.....
112	*Red Clawson	82	.....	.....	.....
114	*Walker	88	.....	.....	.....
116	*Zimmerman	75	.....	.....	.....
117	*Big May	52	.....	.....	.....
118	Sardins	77	2.12	.13	102
119	Chrysolite	85	2.8	1.4	98
120	Beryl	91	1.10	1.5	95
121	Topaz	81	2.	1.5	98
122	Jacinth	90	2.	1.10	92
123	Carnelian	87	2.8	1.9	98
124	Agate	85	3.	1.8	98
125	Onyx	79	2.6	1.	98
126	Opal	88	2.6	1.14	.....

WHEAT—*Continued.*

Number.....	NAME.	Number of Grains Germinated.....	Yield of Grain.....	Yield of Straw.....	Time in Days Ripening.....
127	Garnet	92	2.3	1.1	96
128	Tourmaline	90	2.	1.12	103
129	Feldspar	87	2.12	1.1	92
130	Mica	67	2.	.10	95
131	Casaca	85	2.3	1.	98
133	*Tuscan	96	.....	.....	.....
134	*Essex	93	.....	.....	.....
135	*Tuskana	100	.....	.....	.....
136	*Pearl	96	.....	.....	.....
137	*Hunter's Winter	97	.....	.....	.....
138	White Chaff	85	2.5	1.11	98
145	Red Oregon Club	71	2.8	1.12	103
146	Hedgerow	92	3.3	1.3	103
147	Clower	75	3.	1.8	98
148	Monmouth	85	1.8	2.8	96
149	Russian Spring	87	2.4	1.	98
150	Vermillion	90	2.7	1.4	98
151	Smoky	88	1.10	1.2	96
152	Edenton Fife	92	2.11	1.4	98
153	Nox No. 2	76	2.	1.	103
154	Nox No 1	91	2.12	1.3	101
155	Nox No. 4	80	2.	1.4	96
156	Nox No. 3	67	2.	.12	98
157	Nox No. 5	77	2.	.14	98
158	Pringle's No. 17	84	2.5	1.	98
159	Pringle's No. 18	78	2.	.15	98
160	Wales	89	3.4	1.6	98
160	Northcote's White	98	3.	1.3	96
163	Northcote's Amber	90	3.	1.12	94
166	Reed Straw	69	.....	.....	.....

WHEAT—*Continued.*

Number	NAME.	*Number of Grains Germinated*	*Yield of Grain*	*Yield of Straw*	*Time in Days Ripening*
168	Black Chaff	96	2.8	1.8	56
169	Gneiss' No. 35	58	2.4	1.6	98
171	*Hebron	62	.....	.....	.....
172	Quartz	90	2.8	2.	94
173	*White Medium	63	.....	.....	.....
174	Red Medium	75	.6	.5	106
175	*French Imperial	65	.2	.4	110
176	Nebraska	95	3.	1.12	94
177	White	89	2.10	1.1	95
178	*Kivet	93	.....	.....	.....
179	Rust Proof	95	2.	1.	103
180	*Baltimore	93	.....	.....	.....
181	Davis	87	1.10	.14	101
182	Purple Straw	85	2.	.12	111
183	*Gold Premium	93	.....	.....	.....
184	*Hick's Prolific	77	.....	.....	.....
185	Egenhardt	85	.2	.4	110
186	*Wintergreen	83	.....	.....	.....
187	*St. Ledger	86	.....	.....	.....
189	*Hunter's Spring	96	.....	.....	.....
192	Geiger	90	2.	1.14	96
193	Hornblende No. 37	96	2.4	.8	101
194	Sea Island	90	2.	1.4	97
195	Edmonton	94	1.9	1.8	96
196	Winnipeg Russian	94	2.	.12	98
197	Manitoba	97	2.	1.1	96
198	Winnipeg	95	1.3	1.	101
199	Russian White	94	1.8	1.4	98
200	Hallet's Pedigree	66	1.11	.12	101
201	Sibley's No. 1	87	.14	1.4	109

WHEAT—*Continued.*

Number.....	NAME.	*Number of Grains Germinated*.....	*Yield of Grain*.....	*Yield of Straw*.....	*Time in Days Ripening*.....
203	Rural	83	1.8	1.1	109
204	Velvet Chaff	77	.....	.....	.....
205	Austrian	96	2.11	1.5	98
207	Whittington	94	2.	1.5	97
208	Snowflake	94	2.8	1.5	102
210	Tagarog	88	1.8	1.7	96
212	China White	90	.1	.2	97
213	China Red	97	.2	.4	124
214	Missouri Turkey	90	.2	.4	124
215	*Missouri Medium	92	.....	.....	.....
216	California Walker	82	.2	.3	108
221	*Andrees' Flint	88	.....	.....	.....
222	Saskatchenan	86	1.9	1.4	98
223	Rye	93	2.5	.13	106
224	Frankenstein	49	1.	.12	106
228	*Victoria	85	.....	.....	.....
229	Circassian	97	.2	.5	109
230	Verplank	79	.1	.2	121
231	*Fenton	90	.....	.....	.....
232	Silver	84	2.10	.9	93
233	Sandomirk	69	.6	.4	103
235	*Hopetown	94	.....	.....	121
236	*Talevra	60	.....	.....	120
240	Snake River	70	1.3	.10	103
241	Red River	91	1.7	.10	101
242	Upland	84	1.4	.6	103
243	Hard Manitoba	80	1.5	.10	103
244	Santa Fe	60	1.12	.7	106
245	Neuses	79	2.3	1.6	98
280	Ubridge	97	1.12	.13	101

WHEAT—*Continued.*

Number	NAME.	*Number of Grains Germinated*	*Yield of Grain*	*Yield of Straw*	*Time in Days Ripening*
282	Rust Proof, Hard	90	1.8	1.	94
283	Rust Proof, Soft	94	1.12	.11	98
284	Chili Rodi	88	1.8	.8	95
285	Dagar	84	1.4	.11	94
288	Daud Rhan	95	1.10	.8	92
289	Sarghamam	80	2.10	1.	98
290	Niagara	89	1.10	.14	101
292	*Fulcaster	53	.....	.....	.....
293	*German Emperor	60	.....	.....	.....
294	*Paul's Prolific	57	.....	.....	.....
300	Gypsum No. 38	90	1.14	.14	103
301	Basalt No. 39	95	1.14	.11	103
302	Flour Spar No. 40	94	1.9	.10	103
303	Granite No. 41	92	1.12	.10	103
304	*Platinum No. 42	57	.2	.4	123
305	Porcelain No. 44	97	1.	.8	122
306	Silica No. 43	97	2.3	.14	109
307	Trap No. 45	60	.2	.5	123
308	*Deihl Medium	74	.....	.....	.....
309	*Pool's Red	64	.2	.5	103
310	*Early Rice	82	.....	.....	.....
319	*Deity Red	80	.....	.....	.....
321	*Deity Amber	57	.....	.....	.....
322	Dayton	77	.1	.2	123
323	Rochester	68	1.8	.11	112
332	Hoover	89	1.15	.9	111
335	*Scott's Smooth	77	.....	.....	.....
336	Early Oakley	77	.2	.8	108
337	Genoge	76	2.	.7	162
338	*McGlee's White	84	.....	.....	.....

WHEAT—*Concluded.*

Number	NAME.	*Number of Grains Germinated*	*Yield of Grain*	*Yield of Straw*	*Time in Days Ripening*
339	Egyptian Flint	86	.10	.9	101
340	Crimean	66	.12	.6	106
341	*Martin's Amber	84	.....	.....	.....
342	Indian	85	1.10	.10	98
343	Four-rowed Sheriff	55	.2	.4	84
344	Baart	68	1.8	1.6	131
345	Nonpareil	88	1.	.15	94
346	Royal	90	1.	.8	94
347	Ward's Prolific	69	1.	.5	98
348	Ward's White	39	.6	.5	101
349	Aust. Purple Straw	62	2.	.6	108
350	Aust. Indian	45	.6	.5	101
354	*Sibley's Golden	64	.....	.....	.....
355	Du Toit's	76	1.	1.1	101
356	Farmer's Friend	29	.3	.2	112
357	Steinwedel's Prolific	89	1.10	.9	103
358	Rattling Tom	88	1.4	.6	106
359	Volo	83	.9	.4	106
360	Missoyen	79	1.3	.11	102
361	*Atlanti	85	.....	....	158
362	*Reliable	74	.....	.....	.....
363	Sadoza	56	.11	.4	96
364	Curtis' White	68	1.	.7	99
365	Seven-headed Red	43	1.	.12	98
366	Ontario	38	.9	.11	96

OATS.

Number.....	NAME.	Number of Grains Germinated.....	Yield of Grain.....	Yield of Straw.....	Time in Days Ripening.....
1	White Dutch.....	100	1.	.8½	89
2	Board of Trade.....	99½	1.6	.10	97
3	Australian.....	94	.15	.11	94
4	Black American.....	94	1.4	.14	93
5	Pringle's Hulless.....	89	.14	.10	100
6	Pringle's No. 6.....	97	1.6	.12	94
7	Pringle's No. 4.....	98	1.7	.9	97
8	Pringle's No. 6.....	98	.12	1.1	105
9	Belgio-Russian	96	1.1	.14	95
10	Schonon	98	1.	.12	96
11	Russian Black.....	94	.7	.11	97
12	Alexander	97	1.6	.13	93
13	New Zealand.....	95	1.2	.12	94
14	White Russian.....	87	1.1	.8	101
15	Black Tartarian.....	84	1.	.6	100
16	Early Yellow.....	94	.15	.7	100
17	Early Poland.....	94	.12½	.7	89
18	Poland	96	.10	.7	105
19	Potato.....	94	1.	.8	97
20	Early Angus.....	75	1.	.15	105
21	Chinese Hulless.....	93	.12	.10	103
22	Triumph.....	84	1.2	.8	90
23	Pringle's Excelsior.....	80	.11	.13	90
24	Rust Proof.....	94	.13	.10	97
25	White Eureka.....	85	1.9	.9	90
26	Welcome	94	1.3	.14	105
27	Novelty	96	1.11	.10	90

OATS—*Concluded.*

Number.....	NAME.	*Number of Grains Germinated.....*	*Yield of Grain.....*	*Yield of Straw.....*	*Time in Days Ripening.....*
28	S. E. Black	95	1.4	.13	93
29	Golden Sheaf	89	1.6	.14	97
30	Probsteir	94	1.7	.8½	90
31	Clydesdale	93	1.	.12	97
32	Colorado Yellow	94	1.7	.7	97
33	Austrian No. 1	97	1.6	.7	90
34	Austrian No. 2	84	1.2	.12	90
35	American Beauty	95	1.6	.13	91
36	Burpen's Welcome	94	1.12	.5	91
37	Bohemian	96	.12½	.11	90
38	White German	97	1.5	.9	97
39	Black Champion	95	1.2	.11½	97
40	Monarch	88	1.	.12	103
41	Dakota	93	1.	.7½	90
42	Race Horse	98	.9	1.2	97
43	Canadian	94	1.3	.12½	95
44	Swiss Black	100	1.2	.12	109
45	Victoria	94	.13	.7½	90
46	Hopetown	97	1.3	.11	97
47	Waterloo	96	1.4	.8	97
48	Harris	64	.4½	.7½	70
49	Silesian	79	.12	.9	90
50	Golden Giant	92	1.6	.11	105
51	Orient	93	1.12½	.12	117
52	Lost	91	.1	.2	112

BARLEY.

Number.....	NAME.	Number of Grains Germinated.....	Yield of Grain.....	Yield of Straw.....	Time in Days Ripening.....
1	Smooth Hulless.....	90	1.5	.9	89
2	Winnipeg No. 1.....	94	1.1	1.3	89
3	Winnipeg No. 2.....	90	1.3	.12	90
4	New Zealand.....	97	1.7	1.10	89
5	Chevalier	90	1.5	1.7	94
6	Zealand.....	94	1.9	1.1	90
7	Winter, six-rowed.....	92	1.13	.8	97
8	Purple	84	2.	1.	90
9	Melon.....	100	1.14	1.4	92
10	Del Norte.....	94	2.	2.2	90
11	Triumph.....	81	2.	.15	92
12	Indian No. 4.....	92	1.7	1.6	92
13	Kilma.....	97	2.	1.5	90
14	Scotch Amat.....	97	2.	1.14	90
15	Black	95	2.	1.3	90
16	Palestine	91	1.6	1.5	92
17	Animate	93	1.9	1.12	92
18	Guy Malye.....	94	2.2	1.2	90
19	Mauchurian	96	1.11	1.	90
20	Tricks	97	2.	1.6	90
21	Spring, four-rowed	92	1.14	1.7	90
22	Expert.....	90	1.7	1.4	92
23	Nepaul.....	83	1.6	.13	90
24	Winter, four-rowed.....	95	1.12	1.13	90
25	Phoenix	94	1.10	1.2	92
26	Sibley's Improved.....	91	1.11	1.6	90
27	Mansburg	96	1.13	.13	90

BARLEY—*Concluded.*

Number.....	NAME.	*Number of Grains Germinated*.....	*Yield of Grain*....	*Yield of Straw*....	*Time in Days Ripening*.....
28	Adams' Heavy.....	95	1.9	1.3	92
29	Sibley's Pearl.....	98	2.1	1.9	92
30	Sibley's Purple	94	1.12	1.10	97
31	Wales.....	94	1.10	1.8	107
32	Berkley.....	94	.14	.11	90
33	Zeochrit	79	1.7	1.14	100
34	Perlgerste	84	.14	1.1	112

Report of Horticulturist and Botanist.

The Executive Committee of the State Board of Agriculture:

SIRS: The following papers constitute my report of Station work during the year 1888.

First—Notes on insects and insecticides.

Second—Notes on orchard and small fruits.

Third—Notes on garden vegetables.

Fourth—Notes on the leafage and maturity of fruit and ornamental trees.

Fifth—The apple twig blight.

There are yet incomplete:

First—The work on peppermint.

Second—The work on tobacco.

Third—The botanical analysis of quite a list of plants.

All of which will appear in due time. The notes on tobacco, apple twig blight, orchard and small fruits, garden vegetables, leafage and maturity of fruit and ornamental trees are herewith appended for the annual report. Respectfully submitted,

JAMES CASSIDY,
Horticulturist and Botanist.

NOTES ON TOBACCO.

The cultivation of this plant was continued the past season. The number of varieties grown was 13, as follows: Brenta, Cienfuegos, Wilson's Prolific, Landreth, Persian, Isabella, Spadone, Theiss, Vuetta Abajo, Spagnola, Deli Sumatra, Havana.

All of these were received from the Department of Agriculture last spring, excepting Havana, Landreth and Persian. The area devoted to the crop was 2 roods and 17 perch. The plants were set 3 feet by 2 feet apart. The number of plants harvested was: Of Havana, 5,340; of the varieties, 536; total 5,876. The weight of stalks and leaves green was 4,858 pounds.

The soil is a clay loam that had been in clover sod for three years, and was ploughed under the fall previous, and again in the spring before planting.

Cost of producing one acre of tobacco in Colorado, as follows:

Interest on land	6.00
Plowing and fitting the soil	3.00
8,000 plants at $4 per 1,000	32.00
Planting	4.00
Irrigating	2.00
Cultivating and hoeing	5.00
Worming, topping and suckering	6.00
Cutting and hanging	10.00
Stripping and tieing	10.00
Hauling to market, per mile	50
Total	$78.50

The aim this year was to grow a considerable quantity of the leaf, that its commercial value might be determined.

The details of culture and management are largely a confirmation of opinions expressed a year ago and are as follows:

SOWING SEED.

Seed was sown in a moderate hot bed April 15, and when the plants were large enough, were transplanted into another bed, setting them 3 inches apart. Many of the sash used over the transplanted plants were covered with prepared cloth as a substitute for glass and answers the purpose very well.

The transplanting assures plants of equal vigor, an important factor in securing uniformity in ripening. But transplanting is not essential to success. Plants of uniform vigor may be obtained either by sowing thinly or by thinning out the plants if the seed has been sown too thickly.

The soil of the beds cannot be too rich that the plants may make a rapid growth. As tobacco seed is extremely small, it should be sown on a smooth surface, covered lightly and compressed with a smooth board. The tobacco is liable to be destroyed by a fungus when in the seed leaf and the plants overcrowded in the bed, to avoid which do not sow the seed until the bed has ceased steaming water in the early part of the day only, and air the beds sufficiently to keep the plants thrifty and measurably dry at night. For some days prior to planting in the open air remove the sash entirely in the day time and during the night, if no frost is feared, that the plants may become inured to the full power of the sun.

SOILS.

The finest leaf is raised on light, rich, warm soils. If not naturally rich enough, it must be made so, but we are satisfied that any of our upland soils are rich enough to produce a good crop of tobacco without manure for the present.

Heavier and richer soils will give greater weight of leaf, but will be coarser and bring a lower price than that grown on lighter lands.

VARIETIES.

The varieties of this plant are now quite numerous, but all of them tried here ripen perfectly. The easiest to manage is the White Burley, as it half leaves on the hill, is early, productive, a good color, and is in demand. We have grown the Havana Seed Leaf mainly this year, at the suggestion of a local manufacturer, who pronounced the product of last year's crop of this variety of unusual merit.

PLANTING.

We planted in the open ground May 29, in rows 3 feet by 2 feet apart, irrigating closely as the planting proceeded. This distance apart checks undue vigor, which is of importance in the production of the finest leaf for cigar purposes. Coarser growing sorts like the Burley, would need more room than this affords.

CULTIVATION.

Stirring the soil close up to the plants must begin at once after the planting, and be kept up until they are well established and of good size, which will be when the plants are ready for topping, and when from 2 to 2½ feet high.

IRRIGATION.

The tobacco plant is a great feeder, but has great capacity to find moisture in a dry time. One or two irrigations will be sufficient to get the plants established, after which stirring the soil will enable the plants to attain a good growth and assure their early ripening. No crop is so effectually destroyed on wet lands as tobacco, and none is so little affected by drought.

PRIMING

Consists in removing all the lower leaves near the

ground. These produce an inferior leaf called "lugs," because they get soiled and blackened.

TOPPING.

This operation consists in removing the flower stalks when large enough to be taken out. There is no particular height at which to top. The usual way is to leave 12 to 16 leaves, the result of which is the production of a leafy shoot from the base of each leaf, which must be promptly removed, giving rise to the operation of

SUCKERING.

This operation follows as the result of topping, the purpose being to confine the operations of the plant to the growth and quick maturity of a certain number of leaves, and which must be attended to diligently until the crop is housed. The operations of priming and suckering must be all performed when the plants are wet, or the results will be rust spots on the leaf, which will unfavorably affect its value.

INSECTS.

There are two insects particularly injurious to the tobacco plant, viz.: the tomato worm and the tobacco worm proper. Cut worms are occasionally injurious early in June. The two former appear from the middle to the latter end of June, the larva of which should be diligently sought for during the entire season, as much of the profits of the crop depend upon how well this has been attended to.

CUTTING AND HARVESTING.

The plant is ripe when the plants take on a yellowish, mottled appearance, and when in doubling the leaf it cracks instead of bends. It should not be allowed to

get over ripe or it will be hard to get the leaf to take on a uniform solid color. The White Burley and Havana seed leaf, if strong plants when set out last of May, will be fit to cut in this climate not later than September 1st. When mature the leaf will stand the early frosts of September and part of October with impunity. The operation of cutting consists in splitting the plant by means of stout, thin bladed knife, to within four or five inches of the ground, then cutting off close to the latter, and laying in rows until sufficiently wilted to handle. It is best to cut either during cloudy weather or in the morning or very late in the afternoon, as the sun is much more apt to scorch the leaf here than at a lower elevation. But it is important never to cut more plants at one cutting than can be promptly housed when wilted. Having cut and wilted the plants they are now ready for housing, first placing not more than six or seven plants straddled across ordinary building lath, for convenience in hanging up to cure in the barn. Tobacco sticks when made to order are round or are split out like lath about one inch square at one end and generally a few inches longer than the distance between the joints of the tobacco house.

CURING.

In order to assure the coloring of the leaf it is desirable when the tobacco has reached the barn to lay it in layers about one foot deep on the floor for about ten days. It will need to be turned about three times in that period to avoid heating, avoiding all ventilation and keeping the barn perfectly dark. The leaf will be quite yellow by this time and is now ready to hang up. A little ventilation will now be desirable as judgment may dictate. Mould may appear on the leaf at this stage, which will be gotten over by giving more air, but the leaf must be prevented from drying until it

has taken on a uniform brown color, which will take place in from three to four weeks. Laying the plants on the ground is not indispensable to success, and is not necessary to the White Burley, but it gives the Havana Seed Leaf a much better color than if hung up directly from the field.

BARN.

In this structure the tobacco is hung up to cure. It should have an earth floor, be tightly built and have arrangements to secure ample ventilation when that is needed. The inside of the shed is divided up by rails into widths to accommodate the laths and also into tiers far enough apart to allow the different tiers to hang free of each other.

STRIPPING.

When the leaves and stalks have become brown the former are stripped from the stalks and tied into bundles of about twelve leaves, called "hands." Before doing this it is necessary to dampen the floor to get the leaf pliable enough to handle. In tieing into "hands" the leaves are sorted according to color and size. The bright colored, large, perfect leaves are of the best quality, and are tied by themselves. The second quality is a grade below this, and is the red or brown tobacco. The third grade is called "lugs," and consists of the lower and damaged leaves, which is also kept separate. When stripped and tied into bundles the leaf is then ready for

BULKING AND PACKING,

which is done by making a platform of boards raised a few inches above the beam floor and large enough to hold the bundles in conical heaps 4 or 5 feet in diameter at the base. The tobacco when thus bulked is cov-

ered with blankets to keep it from drying out. Should it come to a heat the piles are broken up and repiled as often as this occurs. A place to bulk tobacco in should be damp enough to prevent the leaf from drying out, but not damp enough to cause it to mould. The natural time for tobacco to ferment is in early summer. Some growers sell their crop while in bulk in the fall to the manufacturer, who packs it in boxes or hogsheads in which it ferments the following May. Tobacco is sent to market in boxes or hogsheads holding from 100 to 1,000 pounds of leaf. Cigar leaf is boxed in the smaller packages, because in larger quantities the leaf is liable to be blackened and hence injured in appearance and value. Packing is done by laying a course of bundles across the bottom of the box or hogshead, filling in on each side of this centre course, keeping the leaves on the outside. The next course is laid across the first, and so on in succession until the package is two-thirds full, when the lever is applied to more firmly compress the whole, which is repeated until the box is full.

This ends briefly the details of management connected with the culture of this crop in Colorado.

APPLE TWIG BLIGHT.

This disease appeared in the neighborhood of Fort Collins the latter part of June and continued to be more or less virulent until late in August. It is identical with the fire blight of the pear. Its varying effect on the two trees is due to the unequal density of their wood; that of the apple being much more dense than the wood of the pear, resists the disease better, so that only the shoots of the current season's growth are affected. The

age and vigor of trees, too, has much to do with the spread of the disease once it has obtained a lodgment. Young trees of unusual vigor being much more liable to succumb when once attacked than trees of slower growth.

To many people whatever happens to an apple or pear tree is attributed to blight. The latter disease is, however, readily determined by the observant tree grower. The twigs of the apple tree are sometimes destroyed by the apple twig borer causing them to appear as if injured by blight.

INJURIES FROM COLD.

Injuries from the cold of winter are observed to affect either the whole tree or particular branches only.

Blight is likely to show on the tips of branches or on spurs, or more rarely on the trunk itself. If the trunk be the part affected only, then the tree, if not attended to at once, is lost beyond redemption.

Trees affected in the stem by cold often put forth leaves in late spring; these on close examination, however, will be found to be deficient in size, quantity and color, and will soon shrivel on their stems. If the tree has been hurt chiefly on the trunk it may leaf out perfectly healthy and normal, but in June these will die also. An examination of the trunk would exhibit patches of bark separated from the wood.

Our trees that blighted badly were in all cases in the most vigorous and thrifty condition, the foliage of full size, and until affected luxuriant and green.

THEORIES.

Various theories have been assigned as the cause of this disease, to be overturned by subsequent observation. The disease has been attributed to insects, to some

unknown species of fungus, to freezing of the sap (Downing), to a deficiency in the soil of some necessary element, to constitutional weakness, to an excess of fertilizers, but none of these theories have been verified by facts.

In 1880, Prof. Burril, of Illinois, discovered bacteria present in connection with the disease, which fact he communicated to the association for the Advancement of Science.

The cause of the destruction of the wood of the apple tree has been proved by Burril and Arthur to be due to a specific organism, a low form of microscopic plant life belonging to the genus Bacterium. The result to the plant is the destruction of the cell contents by the fermentation set up in them by this organism. The latter are found in countless numbers in the affected bark and wood, forming an adhesive mass, which is readily perceived by the unaided eye, exuding from and pervading the surface of the diseased tissues. But it requires a very good microscope to see the separate individual living plant which causes this trouble. The leaf surfaces when affected have a peculiar shiny surface as if varnished, and the twigs turn a brownish black, at first watery, then dry and hard, but the bark never separates readily from the wood. The proofs that these minute organisms cause the disease, are as follows :

1. They are always present in the diseased tissues.

2. Their presence may be detected in advance by the changes occurring in the wood.

3. The contents of the cell gradually disappear with the increase in numbers of the bacteria.

4. The chemical changes in the blighted parts are identical with those caused by bacteria in dead vegetable substance.

5. The disease may be communicated to healthy trees by inoculation.

6. The disease affects only those parts of the tree to which it is accessible, except as it spreads from cell to cell in the structure of the tree.

NAME OF THE PEST.

To this minute organism a specific name has been given by Burril; he has called it *micrococcus amylivirus*, or the starch devouring *micrococcus*. It belongs to the same group of bacterial forms which produce the so-called cholera among swine, and diptheria among men, but is as entirely distinct from them as are the red, white and black oaks from each other.

SHAPE AND SIZE.

The shape and size are matters of interest. They are oval in outline, something like a bean, but with straight rather than curved sides. They are so small that it would take more than 1,000 of them placed end to end to reach around the outside of an ordinary period in common print. But what they lack in size they make up for in numbers. The smallest portion of blighted twig placed in a drop of water in summer, will show their presence to the naked eye by the white, milky cloud which spreads from the portion of wood to the water. But each individual organism is so small as to require a microscope of high power to show its outline.

EFFECTS OF THE DISEASE.

The disease invariably starts at one or two points, not patches or areas, and from these gradually spreads at the rate sometimes of half an inch per day (24 hours). In other cases this rate of growth may be attained only

during the lapse of several weeks or months. When the blight occurs on the trunks it begins at a wound made by pruning, or at a knotty portion of the bark.

As trunk boring insects operate on the roughest surfaces of trees, hence it is not unlikely that they by wounding the tree admit the bacteria.

This is the only way in which the blight can affect an entrance into the structure of the older wood. There must be a breach of the surface, whether caused by insects, the plowman's single tree, or by the unequal expansion of the bark. But in the younger parts it has been demonstrated by Arthur that these organisms gain admission through the tender epidermis of the young growth, and flowers in the month of May. Insects generally carry them around, their germs being sticky, their outer surfaces adhere to each other and to other objects with which they come in contact. How the bacteria are disseminated is not so clear. Plants, including trees, consist of cells. In the cells of the bark in which the bacteria are found there are no openings, yet water passes readily through the walls. Still these germs do in some way penetrate the cells and spread in every direction. That they do not readily do so is seen in the slow progress they make. The main changes in the cells of which plants consist is the disappearance of the starch grains stored for the nourishment of the tree. The progress of the disease is much faster in warm weather, but it is known that parts infected enlarge during the season of rest. Heat and moisture furnish the conditions most favorable to the spread of the contagion. Anthrax or blight is by no means confined to the apple and pear. The Lombardy and other species of poplar, suffer considerably from the same cause. The peach suffers from the yellows, another form of the same disease. Some varieties of the apple and pear are far more subject of this disease than others. Parts of the

country exhibit for the comparative exemption from this disease on useful plants because the external conditions of temperature, light and moisture are favorable to the growth of leafy plants and unfavorble to the parasite. The latter, however, is always present, and when the conditions are favorable they become unusually virulent.

What is called constitutional hardness or the ability to withstand or ward off disease has much influence, we know not why.

REMEDIES.

In regard to remedies we may say there are none, but there are some things, which by attending to, our trees may escape attack altogether, or the attack may be so modified as that trees may recover from it, and be as healthy as ever.

1. We will notice that the selection of varieties known to be least affected by the disease is of the utmost importance in profitable fruit growing in the Northwestern States. Coupled with which we may emphasize on the importace of selecting situations for orchards, having a free circulation of air, and not hedged in by buildings or dense growth of any kind.

2. If a spot on the bark of the trunk or limbs show diseases remove with the knife and bandage the wounded surface. If a portion of the branch is already killed remove the whole well below the point affected. Should you cut into the diseased portion, disinfect the knife by dipping in a strong solution of carbolic acid. Carbolic acid (pure) 5 parts to 100 of water kills the bacteria when immersed in the solution. Double the strength may be used as a wash upon tree wounds, after which the surface should be painted as a protection to them.

3. The application to the trunk and main limbs of the following wash, offers a mechanical obstruction to the entrance of the bacteria through the trunk and through the well known efficacy of sulphur as a fungicide, secures immunity for the trunks from disease.

WASH.

To one-half bushel of lime add eight pounds of sulphur; put in a closed vessel, adding sufficient boiling water to slake the lime; stir thoroughly and dilute to the consistence of whitewash. The light color which is objectionable may be darkened by lamp black. Washing the trunks and limbs once or twice a year with strong lye made from wood ashes, a strong solution of crude potash or concentrated lye, or even soap suds, keeps these parts clean and smooth, prevents cracks by the expansion of the stem, and so reduces exposure to blight. The smooth, clean surfaces, too, much sooner exhibit the first inroads of the disease. No good result need be expected from the application of particular substances to the soil to be absorbed by the rootlets, for absorption may or may not take place, and dissemination is still more uncertain. The tree or plant cannot be forced to take medicine.

NOTES ON CULTURE OF ORCHARD AND SMALL FRUITS.

Fruit growers are having tangible confirmation the present season of what may be accomplished in fruit culture in Colorado, the result of experimental effort on the part of a few venturesome pioneers of horticulture a few years back.

This success is not without its effect in stimulating to greater effort those who may have failed in the past, and in promoting confidence among the new comers into the State, who would seek to do likewise.

It is mainly to aid the latter that these notes on varieties, methods of culture and management, are submitted.

CONDITIONS OF SUCCESS.

The important points to be duly considered are as follows:

1. Location and soil.
2. Varieties to plant.
3. Planting and pruning.
4. Irrigation and after care.
5. Insects and diseases.

LOCATION AND SOIL.

The location of apple and pear orchard in Colorado is an important consideration, in view of the presence of blight in this State for the past two seasons.

An orchard of these fruits should, if possible, be on land with a general trend to the northwest or north, have sufficient fall to be easy of irrigation and not subject to the influences of seepage water.

Elevated positions are best, but very steep slopes should be avoided, because of the difficulty of sufficiently irrigating young trees.

It is important to secure the freest possible circulation of air consistent with that necessary amount of hedge growth to break the force of too violent winds so inimical to the retention of fruit on the trees until ripe.

In low, shady, closely protected orchards in the neighborhood of towns and villages in Colorado blight

will continue to be more or less destructive to particular varieties of the apple and pear in the future.

The soil best suited to the apple is a deep, well drained loam, although it will succeed on a far greater variety of soils than any other fruits.

The plum and pear succeed best on a heavier soil than that suited to the apple.

The peach is at home on light, open, well drained land.

The grape on gravelly soil, well under-drained, enriching the same early in the season, so as to produce vigorous, well-ripened canes as judgment may dictate.

An abundance of such soils exist in this State, especially along the foot hills, where, with irrigation, the grape is at its best.

The raspberry and blackberry make their best growth in strong, heavy, well-drained land, but produce more perfectly ripened wood on lighter soils, and which generally winters in portions of this region without protection. Not so, however, with the larger growth, the result of rich land and abundant irrigation—this must have the protection of Mother Earth to winter safely.

The strawberry delights in a deep, rich, moist loam, good cultivation and abundant moisture during the growing season.

VARIETIES TO PLANT.

In the light of the experience of the early planters in our State, it may be said that it is quite safe to select varieties in accordance therewith.

The plantings of the Russian varieties of the apple, pear and plum in this vicinity are not old enough to determine their season of ripening of value as fruit. But we can speak positively of their hardiness, and the liability to blight of certain varieties of the apple and pear, when grown in cloudy, protected orchards.

The past winter was a test of the hardiness of varieties of orchard fruits in this region, the temperature falling twice to 28 degrees below zero, but this for two nights only. The maximum reading for the same period was 72 degrees above zero.

This injured Ben Davis, in some few cases killed Northern Spy and White Winter Pearmain to the ground.

The following varieties of the apple are hardy and productive in this region, and worthy the attention of planters:

Summer—Yellow Transparent, Tetofsky, Red June, Duchess of Oldenburg.

Fall—McMahon's White, Gideon, Wealthy.

Winter—Ladies' Sweeting, Sheriff, Ben Davis, Pewaukee, Golden Russet, Waldridge.

Crabs—Whitney, Hyslop, Brewer's Sweet.

The transcendent and red and yellow Siberian crabs should not be planted, and ought to be cut down wherever growing, chiefly because they are so prone to blight.

The most promising of the Russian varieties that have fruited here this year is No. 469 (Grandmother), a large apple resembling a Greening, and which promises to be a fair keeper.

Nos. 153 and 116 also fruited liberally. The latter is a large, highly-colored apple, but no keeper. Season September.

The former resembles Plumb's Cider, but smaller with a high bloom. Season September.

These varieties have all a most pronounced aroma.

To keep apples in this climate for any length of time a moist cellar should be at hand for best results.

PLANTING AND PRUNING.

Successful results are very largely contingent on

the condition of the trees or plants at time of planting. If improperly dug and packed, which is too often the case, the chances of their growing in this climate are materially lessened.

It is desirable, other things being equal, that trees, and especially small fruit plants, should be procured from local nurseries.

The age at which it is best to procure fruit trees, small fruits or grape vines, is as follows:

Apple, 3 to 4 years; pear, 3 to 4 years; plum, 2 to 3 years; cherry, 2 to 3 years; peach, 1 year; grape, 2 years; currant, 2 years; gooseberries, 2 years; raspberries and blackberries, 1 year; of strawberries, the youngest plants, those from last year's runners should only be planted, the old plants with black roots are usually worthless.

The best season in which to plant the large or small fruits is generally in the spring, although in a mild winter climate the fall is equally good.

The apple should be planted 20 to 30 feet apart each way; the standard pear, 20 feet; the plum, 8 to 16 feet; the grape, 6 to 10 feet; the raspberry, 4 to 6 feet; the blackberry, 8 feet; currants and gooseberries, 4 to 5 feet; and strawberries, field culture, 1 by 3 feet, garden culture, 1 by 2 feet.

In planting, firm the soil thoroughly, setting the trees a little deeper than they grew in the nursery.

Black cap raspberries are planted with the bud at the crown within three inches of the surface. They often fail to grow because of neglect of this precaution.

Grape vines are planted with the crown buds near the surface, the roots extending obliquely to a depth of 6 or 8 inches.

When trees are received in a dry or frozen condition, they should be buried root and branch in moist earth, or placed in water for a short time, to draw out

the frost gradually and to swell again to natural freshness the shrunken tissues of the tree.

When a tree is received from the nursery it is important before replanting to reduce the top in proportion to its loss of roots, which will usually be from one-half to two-thirds of the whole.

This assures the vigorous starting into growth of a few of the remaining buds.

We incline to the belief that low headed trees are most desirable for this region. This is the experience of tree-growers in similar climates.

Each variety should be allowed to take its own peculiar form; the pruner aiming to prevent all unnecessary growth, and the formation of limbs of equal vigor at an acute angle with the main stem.

To prune trees intelligently it is important to the amateur to know the effect of pruning in the two seasons of rest and activity.

Pruning when the foliage is active lessens vitality, if much of it be done, causing the trees to assume a fruitful condition.

Pruning in the season of rest increases the vigor of trees by concentrating the sap in fewer channels.

If pruning is to be done during the season of growth, the month of June is the best time to do it, the foliage being then firm enough to cover the wound with a layer of wood and bark.

Pruning during the season of rest is best performed in the early part of April.

But whenever pruning is done, it is important in this climate to cover the wounded surfaces either with wax or with paint made of shellac dissolved in alcohol, preferably the former.

IRRIGATION AND AFTER CARE.

Trees and plants of all kinds when replanted, should always receive a good irrigation, and if heavy topped should be staked to avoid wearing at the collar.

The frequency of irrigation, whether for trees or small fruits, is contingent upon such a variety of circumstances, as to obviate the laying down of any specific rule.

Still it will be safe to watch closely all newly set plants and trees, and to water liberally when in active growth until well established in the soil, observing to withhold all cultivation and water early in August, to assure the ripening of the wood as perfectly as possible.

A final irrigation may be given the last days of October or early in November that the roots may have contact with sufficient moisture through the winter and spring months.

Bearing trees of good size and well established are benefitted by having the soil seeded to clover, the latter to be cut once or twice during the season.

This keeps the soil cool and induces a moderate growth, but does not retard the constitutional tendency to start growth early in spring. When trees fail to make at least twelve inches of growth annually then recourse must be had either to cultivation of the soil again, or of manuring the surface of the ground to secure increased vigor. The latter course is the more preferable of the two.

INSECTS AND DISEASES.

The codling moth is now active in Colorado orchards.

It is readily overcome, however, by the use of Paris green and water in the proportion of one pound of the poison to one hundred gallon of water.

This mixture is applied, when the flowers have dis-

appeared, by means of a force pump, a piece of rubber tubing and a nozzle at the end to produce a fine spray.

The strawberry has no serious enemies in this State, unless the garden web worm should appear annually and in large numbers, as it did the past season.

Rust of the foliage is occasionally seen in old and closely shaded beds, which should be ploughed under, and the beds renewed in a new location and from healthy stock. Rust also appears on the foliage of the blackberry, for which the same remedy is recommended.

The raspberry suffers in localities from the work of the larva of the raspberry saw-fly, and as it operates on the under side of the leaf is difficult to kill.

Fresh powdered hellebore, applied with a bellows, will destroy them.

The foliage of the plum is attacked by the larva of the cherry saw-fly (*Silandria cerasi*) and by the plum aphis, which is occasionally seen on trees of weakened vitality. The former does not attack the foliage of the Early Richmond cherry.

The larva of the saw fly is destroyed by fresh hellebore, one ounce to a pail of water, and applied with a pump and spray nozzle.

The chief insect enemy of the grape in this region is an undetermined species of Erythroneura, or leaf hopper.

The kerosene emulsion will destroy these if applied early in the day when the insects are sluggish and cannot jump freely. Later in the day they are so agile as to avoid the application.

A serious enemy to the culture of the apple and pear has appeared in Northern Colorado for the past two seasons, in the presence of the well known pear blight of the older States. This blight, to which the name Micrococcus amylovorus or the starach-eating blight has been given, has been investigated in recent years by

Profs. Burril and Arthur, and their experiments would seem to leave little doubt as to the accuracy of their conclusions. These gentlemen hold that this disease is caused by bacteria, a low form of vegetable life, entering the structure of the tree by means of the tender buds and flowers in early summer, and thus finding a lodgment permeate the affected portion to its destruction.

It affected some Russian varieties of apple and pear in closely protected orchards, as seriously as it did the transcendent, and red and yellow Siberian crabs, known to be so prone to succumb to it.

Mycologists conclude that external applications are of no avail, and that the only hope of saving the affected tree is to cut out the diseased portion well below the parts affected and burn it. But as the trunk is often the affected portion to begin with, we are led to think that an application of lime and sulphur in the form of a wash, to these parts would aid as a preventive from the well known efficacy of the latter as a fungicide. Particular varieties are, however, known to be more prone to blight than others. These should never be planted, as they will certainly prove a disappointment in the end.

The wash is made as follows: To one-half bushel of lime add 8 pounds of sulphur, put in a closed vessel, adding sufficient boiling water to slack the lime; stir thoroughly and dilute to the consistence of whitewash. The color which is objectionable may be darkened by adding lamp black.

Propagation of the pear by root grafts.

It is well known that a good stand of the pear from root grafts is not often obtained.

One thousand root grafts were purchased by Moody

& Sons, of Lockport, N. Y., last spring, showing this fall the following per cent of living vigorous trees:

Bartlett,	65 per cent.
Clapp's Favorite,	90 per cent.
Auzon,	90 per cent.
Flemish Beauty,	60 per cent.
Keifer,	92 per cent.
Clapp's No. 3,	75 per cent.

APPLE ROOT GRAFTS.

Three thousand root grafts of the following varieties were purchased of the Pike County Nurseries, Mo., and grown the past season with the following results:

McMahon's White,	85 per cent.
Northwestern Greeting,	90 per cent.
Yellow Transparent,	88 per cent.
Clayton,	40 per cent.
Mann,	70 per cent.
McIntosh,	80 per cent.
Red Bietigheimer,	75 per cent.

NOTES ON LEAFAGE OF ORCHARD AND ORNAMENTAL TREES AND SHRUBS.

Observations, for two seasons, as to the period of leafage and their maturity have been taken on the following varieties of the apple and pear, which are presented in tabulated form.

Long retention of leaf in the fall indicates in a variety the need of a longer season in which to mature its wood, and would also account for its killing back were the ensuing winter sufficiently cold.

The Russian and some other varieties of the apple and pear, retain their foliage quite late in the fall, but are sufficienty hardy to withstand a low drop of the thermometer.

Still in respect to retention of leaf there is a marked difference between bearing trees and young, vigorous stock of the same varieties under similar conditions.

Location, too, has much to do with the date of appearance of foliage. There is a difference of quite a week between the leafage of trees in protected situations and those away from buildings or dense plantations of trees.

There is also some variation in the ability of varieties similarly situated to set fruit in the presence of unfavorable conditions of weather.

The Ben Davis usually sets some fruit annually, and under circumstances fatal to other varieties similarly situated.

The hardiest kinds mature their leaves early in the fall, but many of them begin growth again correspondingly early in the spring, which lessens their value for the production of fruit.

The most desirable varieties then for our climate are such as respond slowly to the high diurnal temperature of the early spring of this region.

These notes become valuable, as they cover a number of seasons in different localities, furnishing data concerning the behavior of varieties under various conditions of soil and climate throughout the United States.

What is meant by first formed leaves in the table is such as appear on the spurs, or the development of the terminal bud, which would be nearly synchronous with the appearance of bloom.

Fully formed leaves on the young shoots of any length occurs in this climate from May 20 to the end of the month.

The Russian orchard fruits were originally sent out by numbers from whatever source derived. This was unavoidable because of difficulties in translating the Russian names into pronounceable English.

The first column, therefore, gives the numbers under which the variety was imported and distributed in the United States, and the abbreviation "M" refers to the importation from Moscow by the Iowa Agricultural College. Similarly the words Orel, Boronesch and Riga refer to the importations from these places.

The second column contains the name recommended by Mr. Gibb, at the suggestion of the American Pomological Society.

LIST OF ORCHARD AND SMALL FRUITS

growing at the College. Those marked with an asterisk are too tender for this region. Most of the varieties have had but one season's growth here, so that no estimate can as yet be made of their value for this region.

APPLES.

Mann	King of Tomkins
Price's Sweet	Bendalls
Winter Red	Landon
*Baldwin	Loy
Maiden's Blush	Osceola
Seek No Further	Red Lady Finger
Fameuse	Hyatt's Beauty
Early Harvest	Lansburg
Geniton	Utter's Red
Grimes's Golden	Red Romanita
Wythe	Shackelford
Fall Pippin	August
Excelsior	Spencer
Clark's	Charlamoff (Summerville)
Keswick Codlin	Everbearing
Delaware Sweet	Fall Orange
Rome Beauty	Coat's Sweet

Jefferis
Townsend's
*Lady Henniker
*Northern Spy
Mann
Babuscheus
Red Repka
White Wokins
Kremis
Sandy Glass
Antonooka
Kruder
Red Wine
Russian Gravenstein
Louis' Favorite
Sedenets
Turnell
Repkamalenka
Early Sweet
Kurak Reinette
Aport Orient
34, Name Lost
Yellow Sweet
Howard
Raspberry
Lipin
Glass Winter
Brett
Turnipy Juicy
Briody
Petter
Russian Sweet Pear
Kalkidon
Hibernal (Hoskins)
Green Sweet
Thorp's Sweet
Good Peasant
Brovinka
Anis
Bleachwood
Wolf River
Fonaric,
Russet No. 1 (Palton)
Moscow
Giant Swaar

Delaware Winter
Jarmonite
*Princess Royal
*Huntsman's Favorite
Clayton
Prolific Sweet
Cook's Greening
Golden White
Arnold Sweet
Royal Table
Long Arcade
Yellow Anis
Mazensks
Rosy Aport
Goualtian
Lowland Raspberry
Black Russian
Anisisobka
Muscat
Hibernal (Watson)
Red Teat
Rubets
Brewster
Arabia (Kellogg)
Orange Winter
Arcad
Blessed Calville
White Borodorka
Aport (Riga)
Cross (Irne)
Early Blue
Early Cinnamon
Ambrose
No. 519
Ukraim
German Calville
Tiescu Nausen
Golden Russet
Watermelon,
Vargal
Repolovka
Early Champaign
Black Fameuse
50 Orel
44 Voronesh

Polish Cinnamon
Gipsey
St. Peters
Papa
Long
Winter Streaked
Hare Pipka
Arabskal
Biel
Winter Striped
Anisim
Cross Apple
Brobonka
McIntosh
Peach (Montreal)
White Starkis
Zototoroff
Russian Greening
Good Peasant
Aport
Water
Rich Winter
Arabka
Longfiled
Charlamoff
Arnold Russet
Late Russian
Borkoff
Brabskoe
Barloff (Kellogg)
September
Anis
Sejanka
Vargal
Russian Rambeau Queen
Rebecca
Repka Kislayia
Cklanka
Bogdanoff
Lead
Sweet Cross
Loeds
Taggart Sweet
Kursk Reinette
Pointea Piplea
No. 250
Bunker
Aport
Newport Sweet
Northwestern Greening
116 Orel
Wandon's Blush
Mammoth Black Twig
Telfer Sweet
Clayton
Burton
Foote
Kleueskol
Potter Red
Large Transparent
Switzer
Arabskae
Hollister Sweet
Vargulek
Throne
Nomenskol
G. Kerr
Sweet Cross
Kluevskol

PLUMS.

Varieties of *Prunus Domestica*—

Those marked with an asterisk are not hardy here.

Lombard
Merunka
Moldavka
Moore's Arctic
Orel, 19
Russian 2
Russian 3
Shropshire Damson
Smith's Orleans
Ungarish

Yellow Egg
Hoag's Seedling
Golden Drop
Imperial Gage

Varieties of *Prunus Americana and Prunus Chicasa*—

Miner
DeSoto
*Early Red
Forest Garden
Maquokita
Forest Rose
Rolling Stone
Wayland
Wolf
Black
Marianna
*Indian Chief
Golden Beauty
*Jennie Lucas
Colorado Queen
Weaver
Speer
*Robinson
Barset's American

GRAPES.

Those marked with an asterisk have ripened fruit this year.

Prentiss
Rochester
Niagara
Norwood
*Norman's Muscatine
*Blood's Black
Pearl
Reindeer
Iona
Chasselsas
El Dorado
Concord
*Cottage
*Elvira Seedling
*Noali
*Eumelan
Virgennes
Lindley's Seedling
*Massasoit
*Lady Washington
Worden
*Moore's Early
Janesville
Brighton
*Clinton
*Clinton
Downing
Martha
*Bacchus
Norfolk
Goethe
*Merrimack
*Norton's Virginia
*Lindley's No. 2
*Butter
Oneida
*Early York
*Early Delaware
August Giant
Jessica
*Green's No. 2
*Taylor's Bullet
*Transparent
*Delaware
Welding
Cambridge
Craveling
Rogers' No. 39
Isabella
*Champion
Amber Queen
Rogers' No. 28
Poughkeepsie
Diana

Pocklington
Amber
Agarvam
Black P
Rogers No. 44
Jefferson
Telegraph
*Early Victor
Elvira
Moore's Diamond
Martha
Rogers, 43
*Senasqua
Rogers, 4 (Wilder)
Ulster Prolific
Marion
Black Eagle
Rogers, 41
Highland
Eaton
Dracut Amber
R. B. Hayes
Triumph
Green's Golden
Woodruff Red
Jewell
Cynthiana
Hartford
Challenge
Etta
Oriental
Perkins
Empire State
Bland
*Lady
Duchess
*Montefiore

RASPBERRY.

Beebe's Golden
Superb
Brandywine
Reliance
Thwack
Lost Ruby
Hilborn
Earhart
Surprise
Winant
Canada
Hopkins
Tyler
Mammoth Cluster
Gregg

BLACKBERRY.

Early Harvest
Erie
Wilson
Early Cluster
Hoosac
Knox
Minnewaski
Lawton
Stone's Harvest
Dorchester
Taylor
Kittanning
Western Triumph

GOOSEBERRIES.

Crown Bib
Smith's Improved
Goldfinder
Hedge Hog
Whitesmith
Green Gage

Old Scotch Red
Downing
Industry
Rifleman
Houghton
Nutmeg

CURRANTS.

Victoria
Red Dutch
Crandall
White Dutch
Fay
Cherry Currant
Lee's Black
White Grape
Versaillaise

STRAWBERRY.

Connecticut Queen
Duanis Chief
Ontario
Downing
Jewel
Belmont
Manchester
Jumbo
Warsaw
Jersey Queen
Bomba
Mt. Vernon
Indiana
Cornelia
Mammoth
Sandy
Cohansic
Summit
Captain Jack
Glendale
Cetewayo
Crystal City
Albany
Bancroft
Ohio
Ironclad
Jucunda
Cornelia
Phelps
Monarch
Lida
Scarlet Queen
Longfellow

See tables accompanying.

CALENDAR OF VARIETIES OF THE APPLE FOR THE SEASONS OF 1887 AND 1888.

No.	Name.	Leaves formed in		Leaves mature in		Description of Trees	Remarks.
		1887	1888	1887	1888		
....	Russian Sweet	April 25	April 30	Nov. 1	Nov. 5	Erect habit, bark red brown	Tree of moderate vigor; some blight on small limbs.
247	Popoff	April 22	April 22	Oct. 31	Nov. 10	Upright habit, bark reddish brown	Tree hardy, fruit medium or small, season September.
....	Red Stellin	April 25	April 22	Nov. 5	Nov. 7	Erect habit, red brown bark	A promising German tree, probably hardy.
....	McMahon's White	April 20	April 20	Nov. 1	Nov. 5	Spreading habit, bark dark brown	Tree vigorous hardy, fruit medium size, season October.
....	Red Reightheimer	April 22	April 22	Oct. 31	Nov. 5	Upright habit, bark brown speckled	Tree not hardy when young.
....	Walbridge	April 25	April 25	Nov. 10	Nov. 1	Erect habit, bark dark brown	Tree productive, not iron clad, season late Winter.
....	Scott's Winter	April 22	April 25	Oct. 31	Nov. 3	Spreading habit, bark brown	Tree hardy and vigorous, fruit medium size, season late winter.
....	Gideon	April 25	April 25	Nov. 5	Nov. 5	Upright habit, bark dark brown	Blighted in close Orchard, early and prolific bearer, season November.
....	Fink	April 25	April 30	Nov. 1	Oct. 28	Upright habit, bark slate color	Tree healthy, apparently hardy, season winter.
....	Autumn Strawberry	April 20	April 22	Nov. 1	Nov. 1	Upright habit, bark red brown	Tree hardy, early productive, season October.
....	Whitney Crab	April 25	April 22	Nov. 5	Nov. 5	Upright habit, bark dark brown	Tree hardy, annual bearer, blights some, season August.
....	Duchess of Oldenburg	April 20	April 20	Oct 27	Oct. 31	Upright habit, bark reddish brown	Tree hardy, an annual bearer, season August.
....	Ben Davis	April 22	April 25	Nov. 10	Nov. 5	Spreading habit, bark dark brown	Not iron-clad, early and abundant bearer, valuable for market.
....	Quaker Beauty	April 20	April 22	Oct. 31	Oct. 25	Spreading habit, bark red brown	Tree of great vigor, fruit medium size, season October to January.
....	Pewaukee	April 30	April 25	Nov. 5	Nov. 1	Spreading habit, bark dark brown	Tree not iron-clad, early and prolific, season early winter.
....	Moscow Pear	April 20	April 22	Nov. 1	Oct. 25	Upright habit, bark light brown	Tree healthy, vigorous.
....	Hughes' Virginia Crab	April 20	April 18	Oct. 20	Oct. 25	Upright habit, bark dark brown	Tree a good grower, of great vigor.

CALENDAR OF VARIETIES OF THE APPLE FOR THE SEASONS OF 1887 AND 1888.

No.	Name.	Leaves formed in		Leaves mature in		Description of Trees.	Remarks.
		1887	1888	1887	1888		
....	General Grant (crab).	April 22	April 25	Nov. 10	Nov. 1	Upright habit, bark red brown.....	Tree hardy, fruit good size, excellent for cooking.
1277	Bohemian Girl.....	May 4	May 1	Nov. 5	Nov. 5	Upright habit, bark dark brown....	Tree healthy, of great vigor, late to leaf and flower.
....	Gros Mogul.....	April 30	April 27	Nov. 5	Oct 31	Spreading habit, bark dark brown.	Tree healthy and vigorous, said to be desirable.
....	Yellow Transparent.	April 22	April 20	Nov. 5	Nov. 5	Upright habit, bark brownish.....	Tree of great vigor, healthy, early bearer, season August.
230	Titovka	May 1	May 4	Oct. 31	Oct. 27	Upright habit, bark red brown.....	A valuable variety, tree healthy, season winter.
....	Peter the Great	May 1	April 28	Nov. 10	Nov. 10	Spreading habit, bark light brown..	Moderate vigor, blighted some, tender when young.
....	Carolina Red June..	April 25	April 31	Nov. 5	Nov. 20	Upright habit, bark dark brown....	Hardy, moderate vigor, fruit medium to small, season July.
....	Black Anis	April 27	May 2	Nov. 5	Nov. 15	Bark dark brown.....	Tree vigorous, killed back one foot, tender here when young.
....	Alexander	April 22	April 25	Nov. 1	Nov. 1	Upright habit, bark dark brown....	Hardy, fruit large, extra for cooking, season September.
342	Thaler	April 25	April 31	Nov. 1	Nov. 5	Spreading habit, bark brown.....	Tree vigorous, fruit good size, season fall, one of the best.
....	Red Apart.....	April 30	April 25	Nov. 5	Nov. 5	Erect habit, bark reddish.....	Tree hardy here, moderate vigor, season said to be early winter.
....	Boiken	April 22	April 25	Nov 5	Nov 10	Spreading habit, bark brown.....	A German apple hardier than Fameuse, season winter.
....	Golden Reinette.	April 22	April 25	Oct. 31	Oct. 25	Spreading habit, bark dark brown	Tree healthy, fruit golden, quality best, season early winter.
....	Constantine	April 30	April 25	Nov. 5	Nov. 5	Spreading habit, bark brown red.. .	A variety of great vigor, hardy.
....	Baluschens.....	April 25	April 30	Nov. 10	Nov. 5	Erect, bark dark brown speckled....	Tree very vigorous, killed back 12 inches.
584	Erdbeer	May 5	May 1	Nov. 8	Nov. 5	Upright habit, bark red brown.....	Hardy and prolific, fruit too small, season September.
....	Red Astrachan.....	April 30	April 25	Nov. 10	Nov. 7	Upright habit, bark red brown.....	Hardy, shy bearer, season July.

324	German Calville	April 25	April 22	Nov. 5	Nov. 1	Bark red brown	Tree of moderate vigor, fruit large, season December.
10	Meraine	April 22	April 22	Nov. 15	Nov. 1	Upright habit, bark red brown	Tree healthy, medium vigor, season winter, best for cooking.
M 327	Yellow Arcad	April 27	April 30	Nov. 5	Oct. 31	Bark brown speckled	Tree hardy, productive, season late winter.
152	Breskorka	April 25	April 22	Oct. 31	Oct. 31	Spreading habit, bark brown	Vigorous and healthy, fruit good size and best quality, season August.
M 4M	Ostrokoff	April 18	April 22	Nov. 5	Oct. 31	Upright habit, bark dark brown	Iron-clad, healthy, fruit good size and quality, season winter.
380	Moscow Pear	April 25	April 22	Nov 5	Nov. 5	Spreading habit, bark red brown	A true iron-clad, fruit of good quality, season August.
599	Romenskae	April 25	April 25	Nov. 10	Nov. 5	Spreading habit, bark dark brown	Vigorous grower, fruit medium size, yellow, season winter.
155	Arabka	April 27	April 25	Nov. 10	Nov. 1	Spreading habit, bark pale brown	Tree vigorous, hardy and productive, season mid-winter.
M 75	Silken	April 25	April 25	Oct. 27	Oct. 31	Spreading, bark red brown, speckled	Tree a good grower, healthy, fruit of good quality, season winter.
M 361	Pointed Pipka	April 22	April 22	Nov. 5	Oct. 31	Spreading, vigorous bark, red brown	Very vigorous, some blight, fruit of good quality, winter.
569	Rosenhager	April 28	April 30	Nov. 1	Nov. 1	Upright habit, bark light brown	Vigorous, blighted some, growth 2 feet.
8	Bielgowd	April 28	April 30	Nov. 5	Nov. 5	Spreading habit, bark pale brown	Tree hardy, no blight, good grower.
M 6	Red Pine	April 28	April 25	Nov. 5	Nov. 5	Upright habit, bark pale brown	Vigorous and productive, some blight, fruit small, August.
153	Imperative	April 30	April 25	Nov. 10	Nov. 5	Spreading habit, bark dark brown	Healthy, no blight, fruit medium size, early bearer, September.
25	Aport	April 22	April 20	Nov. 5	Nov. 1	Upright, bark dark brown speckled	Tree vigorous and hardy, fruit large, season early winter.
20	Rosy Repka	April 30	April 30	Nov. 5	Nov. 1	Upright habit, bark light brown	Tree healthy and hardy, season winter, considered valuable.
315	Herren	April 30	April 25	Nov. 5	Nov. 1	Spreading habit, bark dark brown	Tree hardy, fruit highly colored, season early winter.
447	Keiv Reinette	April 27	April 25	Nov. 5	Oct. 31	Spreading habit, bark red brown	Fruit of medium size, color greenish red, a good keeper.
15	Avenarius	April 22	April 20	Oct. 31	Oct. 31	Spreading habit, bark dark brown	Tree vigorous, grew 3 feet last season.
M 469	Grandmother	April 22	April 22	Oct. 30	Oct. 30	Spreading	Tree blighted some, a promising variety, fruit large, good keeper.
236	Antonovka	April 28	April 30	Nov. 10	Nov. 15	Bark light brown	A true iron-clad, fruit bright yellow, season winter.
367	Red Streak	April 30	April 30	Nov. 5	Oct. 31	Upright habit, bark light brown	Blighted badly, tree vigorous, fruit said to be of extra quality.

CALENDAR OF VARIETIES OF THE APPLE FOR THE SEASONS OF 1887 AND 1888.—*Concluded.*

No.	Name.	Leaves formed in	Leaves mature in			Description of Trees.	Remarks.
		1837	1888	1887	1888		
379	Revel Pear	April 25	April 22	Nov. 1	Oct. 31	Upright, bark pale brown	Tree a good grower, hardy and productive, but of little value.
508		April 22	April 22	Nov. 5	Oct. 31	Upright habit, bark brown	This variety blighted badly in a close orchard.
116	Heidorn	April 25	April 27	Oct. 31	Oct. 31	Upright big habit, bark light brown	Fruit large, highly colored; season September; tree blighted some.
402	Bersdorp	April 27	April 25	Nov. 5	Nov. 1	Upright habit	Tree hardy, branches numerous, fruit like Ben Davis; winter.
280		April 30	April 30	Nov. 10	Nov. 15	Spreading habit, bark dark brown	This variety of medium vigor, free from blight.
234	Muscatel	April 22	April 20	Nov. 10	Nov. 6	Upright habit, bark dark brown	Hardy, vigorous, early, productive; season September.
328	Peterhoff	April 30	April 25	Nov. 10	Nov.	Spreading habit, bark red brown	Tree vigorous, free from blight; in bloom this year; no fruit.
100	Putim	April 30	April 27	Nov. 9	Nov. 5	Habit very upright, bark red brown	This variety is exceptionally hardy and free from blight.
7M	Osimoe	April 22	April 18	Oct. 27	Oct. 25	Bark dark brown, black twigs	Tree of moderate vigor, hardy, no blight.
65 M	Krimskoe Vosducnoe	April 20	April 18	Oct. 22	Oct. 20	Bark red brown	
519		April 25	April 22	Oct. 31	Oct. 31	Spreading, bark brown, speckled	Tree vigorous, healthy; grew over 2 feet this year.
....	Brier Sweet	April 25	April 22	Nov. 5	Nov. 5	Upright habit, bark brown	Tree hardy, early bearer; fruit good size, desirable; September.
....	Isham Sweet	April 22	April 19	Nov. 10	Nov. 5	Upright habit, small leaf	Tree of moderate vigor.
....	White Rearmain	April 25	April 30	Nov. 5	Nov. 5	Spreading habit, bark brown	Tender when young, fruit good size and quality, winter.
....	Fameuse	April 30	April 28	Nov. 15	Nov. 10	Spreading habit, bark red brown	Tree hardy and vigorous, fruit medium, season winter.
....	Hass	April 22	April 22	Nov. 10	Nov. 5	Upright habit	Tree hardy, vigorous, productive and desirable, Sept. to Nov.
....	Lake Winter	April 28	April 30	Nov. 1	Nov. 1	Upright habit, bark red brown	Strong grower, fine quality, Nov.

....	Lady Elgin.....	April 22	April 19	Nov. 5	Nov. 10	Upright habit.....	Tree slow grower, fruit of good quality.
....	Salome.....	April 25	April 20	Nov. 10	Nov. 5	Erect habit, bark brown.....	Tree hardy, vigorous, early and productive, January.
....	Orion.....	April 18	April 22	Nov. 10	Nov. 8	Upright habit, reddish bark.....	Tree healthy, of moderate vigor.
....	Fall Strip	April 22	April 18	Oct. 31	Nov. 7	Upright habit, dark brown bark.....	Tree vigorous, early and productive bearer.
....	Missouri Pippin.....	April 22	April 25	Nov. 1	Nov. 5	Spreading, bark red brown.....	Tree vigorous and hardy, fruit fair size and quality, January.
....	Wealthy.....	April 22	April 20	Nov. 8	Nov. 5	Spreading habit, bark red brown....	Tree hardy, healthy, productive and desirable.
....	Tetipsky.....	April 20	April 19	Oct. 27	Oct. 29	Upright habit, bark light brown.....	Tree hardy, productive and desirable, ripe July.

CALENDAR OF VARIETIES OF THE PEAR FOR THE SEASONS OF 1887 AND 1888.

No.	Name.	Leaves formed in		Leaves mature in		Description of Trees.	Remarks.
		1887	1888	1887	1888		
347	Gavorsk*	April 30	May 2	Nov. 6	Nov. 8	Bark dark brown speckled	Tree hardy, good grower, valuable for cooking.
392	Kunkaya*	April 25	April 22	Nov. 1	Nov. 5	Bark dark brown speckled	Tree hardy, a good grower, free from blight.
516	Lemon*	April 30	April 30	Nov. 5	Nov. 10	Bark dark brown speckled	Tree vigorous, hardy and healthy.
418	Early Bergamot*	April 25	April 30	Nov. 1	Oct. 30		Appears as yet to be a slow grower. hardy, no blight.
16	Waxen. *	April 22	April 25	Nov. 12	Nov. 15		Subject to blight, lost 5 trees out of 6.
439	*	April 30	May 2	Nov. 5	Nov. 5		Tree vigorous, healthy, free from blight.
14	Limber Twig*	April 25	April 30	Nov. 10		Upright habit	Tree very vigorous, blights badly; worthless
508	Seedless *	April 27	April 30	Nov. 1	Nov. 1	Bark dark brown	Vigorous, healthy, and said to be productive.
395	Red Bergamot*	April 30	May 2	Nov. 5	Nov 7	Bark dark brown speckled	Tree a good grower, hardy and free from blight.
109	Scented*	April 30	May 4	Nov. 6	Nov. 8	Bark pale brown	Apparently hardy, free from blight, said to be of fine quality.
....	Sheldon	April 27	April 30	Nov. 5	Nov. 5	Upright habit, bark yellowish	Tree tender; a weak grower here.
....	Lucrative	April 27	April 30	Nov. 7	Nov. 10	Very upright, bark slate color	Tree of great vigor, hardy, early and productive, September.
....	Flemish Beauty	April 27	April 25	Nov. 3	Nov. 5	Spreading, bark dark brown	Tree vigorous, hardy, early bearer, season September.
....	Beurre Clairgean	April 30	April 27	Nov. 5	Nov. 5	Bark reddish brown	Tree good grower, tender when young, season early winter.
....	Seckel	April 30	April 28	Nov. 1	Nov. 1	Erect habit, bark dark	Tree a slow grower, injured by cold last winter, Sept. and Oct.
....	Tyson	April 27	April 30	Nov. 5	Oct. 31	Upright, bark olive yellow	Great vigor, hardy, early bearer, one of best summer varieties.
....	Keifer	April 30	April 25	Nov. 7	Nov. 5	Bark reddish brown	Tree a good grower, injured by cold

....	Indian Queen.....	April 27	April 29	Nov. 7	Nov. 3	Upright habit, dark brown.....	Tree of great vigor, no blight, in flower May 3.
....	Birkett.....	May 4	May 2	Nov. 10	Nov. 6	Bark slate color.....	Tree tender and a slow grower, not promising.
....	Clapp's Favorite.....	April 25	April 23	Nov. 10	Nov. 10	Upright, bark grayish brown.....	Tree hardy, of uncommon vigor, desirable, season September.
....	Osband's Summer...	April 25	April 22	Nov. 1	Oct. 30	Upright, bark gray speckled.....	Tree of medium vigor, hardy, early bearer, season August.
....	Bartlett.....	May 4	April 31	Nov. 15	Nov. 12	Upright, bark yellowish.....	Tree too tender for Northern Colorado.
....	Le Conte	.....	.....	.....	Nov. 10	Bark dark gray speckled.....	On trial here.
....	Anjou	.....	.....	.....	Nov. 10	Upright, bark light brown speckled.	On trial here.
....	Garber.....	.....	.....	.....	Nov. 10	Bark brown speckled..... ...	On trial here.
....	Longworth.....	.....	.....	.....	Nov. 5	Bark light brown.....	On trial here.
....	Victor	.....	.....	.....	Nov. 12	Bark gray speckled	On trial here.
....	Crow's Choice.....	.....	.....	.....	Nov. 20	Bark dark gray.....	On trial here.
....	Duchess	.....	.....	.....	Nov. 10	Up., vigorous, light brown speckled	On trial here.
....	Louise Bonne.....	.....	.....	.....	Nov. 10	Upright, vigorous, bark light brown.	On trial here.
....	Sapiegianka	.....	.....	.....	Nov. 5	Bark light brown.....	On trial here.
....	Clapp's No. 3.....	.....	.. ..	.....	Nov. 20	Bark dark gray.....	On trial here.

CALENDAR OF TREES AND SHRUBS FOR THE SEASON OF 1888.

NAME OF SPECIES.	*Leaves Formed.*	*Leaves Matured.*	REMARKS.
Butternut (Juglans Cinerea)	May 12	Oct. 20	As valuable for the plains as the Black Walnut.
Aspen (Populus Tremuloides)	April 20	Oct. 20	Valuable only for ornamental plantations.
Alder (Alnus Glutinosa)	May 1	Nov. 1	Kills back. A small Tree of slow growth.
Snowball (Viburnum Opulus)	May 5	Nov. 7	Ornamental Shrub, cultivated for its white flowers. Hardy.
Buckthorn (Rhamnus Cathartica)	May 5	Nov. 15	An admirable Hedge Plant or small Tree.
European Barberry (Berberis Vulgaris)	May 1	Nov. 12	One of our best Hedge Plants, showy in fall and early winter.
Lombardy Poplar (Populus Dilitata)	May 5	Oct. 31	Tree. Short lived, but valuable for wind breaks.
Red Oak (Quercus Rubra)	May 7	Nov. 5	Tree. A slow grower. On trial here.
European Alder (Alnus)	May 1	Nov. 5	On trial here.
Lilac (Syringa Vulgaris)	May 1	Nov. 20	Desirable for ornamental purposes only. Hardy and big growers.
Matrimony Vine (Lycium Barbarum)	May 1	Nov. 1	One of our best Bee Plants, and a desirable Trailing Shrub.
English Elm (Ulmus Campestris)	May 7	Nov. 20	Seems desirable in every way.
White Elm (Ulmus Americana)	May 7	Oct. 22	Valuable for timber and ornamental plantations.
Hazel (Corylus Avelana)	May 1	Nov. 5	Hardy, deciduous Shrub. On trial.
Black Cherry (Prunus Serotina)	May 10	Nov. 10	This species is well adapted to prairie planting.
Coffee Tree (Gymnocladus Canadensis)	May 10	Nov. 5	On trial here. A slow grower.

Sycamore Maple (Acer Pseudo Platinus)	May 10	Nov. 7	On trial here.
Sugar Maple (Acer Saccharinum)	May 5	Nov. 11	The most valuable of the Maples. A slow grower here.
Sycamore (Platanus Occidentatis)	.....	Nov. 7	On trial here.
English Walnut (Jaglans)	May 10	Nov. 10	Leaves killed by frost. On trial here.
Yellow Birch (Betula Lutea)	May 10	Oct. 31	A small Tree. Kills back occasionally.
Wild Olive (Elaeagnus Norteuris)	May 5	Nov. 10	Leaves killed by frost. A desirable small Tree.
Hydrangea (Hydrangea Arborescens)	May 12	Nov. 5	A desirable ornamental Shrub. Flowers here late in May.
Sweet Shrub (Calycanthus Horidus)	May 10	Nov. 7	Injured by frost, but usually reliable and desirable.
Mock Orange (Philadelphus Gordoriensis)	May 1	Nov. 10	A very vigorous and desirable Shrub.
Honeysuckle (Lonicera Halleana)	May 5	Nov. 10	Somewhat tender, but usually a reliable Shrub.
Honeysuckle (Lonicera Reticulata)	.....	Nov. 7	Killed to the ground line.
Trumpet Honeysuckle (Lonicera Sempervireus)	May 3	Nov. 15	A well known climbing Shrub. In flower May 5.
White Snowberry (Symphoriocarpus Occidentalis)	May 5	Nov. 10	Killed back to the old wood.
Hydrangea Arborescens	May 3	Nov. 15	Shrub. Injured by frost.
Tartarian Honeysuckle (Lonicera Tartarica)	May 5	Nov. 20	Hardy and desirable Shrub from Russia.
Mountain Ash (Pyrus Ancuparia)	May 3	Nov. 10	A hardy, desirable, small ornamental Tree.
Mountain Ash (Pyrus Americana)	May 7	Nov. 10	A small Tree, of less vigor than the last mentioned.
Kilmarnock Willow	May 5	Nov. 1	A rapid grower, excellent for hedges or screens.
Balsam Poplar (P. Balsamifera)	April 20	Oct. 31	A desirable species for the plains.
Spierar (Spirear Opulifolia)	May 5	Nov. 1	Hardy, vigorous, desirable Shrub.
Black Locust (Robinia Pseudo Acacia)	May 12	Nov. 1	A valuable timber and shade Tree, perfectly hardy.
European Elm (Ulmus Latifolia)	May 3	Nov. 7	This species on trial here.

CALENDAR OF TREES AND SHRUBS FOR THE SEASON OF 1888—*Continued.*

NAME OF SPECIES.	*Leaves Formed.....*	*Leaves Matured ...*	REMARKS.
Cottonwood (Populus Augustifolia)	April 25	Oct. 10	A native species, narrow leaved. Not desirable to plant.
Cottonwood (P. Augulata)	May 5	Oct. 27	This species holds its leaves late. Nearly free from rust. Desirable.
Purple-leaved Barberry (B. Purpurea)	May 1	Nov. 12	A desirable and beautiful Shrub. Valuable for hedges. Hardy.
Buffalo Currant (Ribes Aureum)	April 22	Nov. 8	A native Shrub. Desirable for ornamental planting.
Red Cherry (Crasus Rubra)	May 5	Oct. 31	A hardy and serviceable small Tree for the plains.
White Birch (Betula Alba)	May 10	Nov. 1	A very desirable small Tree. Hardy.
Black Walnut (Juglans Nigra)	May 12	Oct. 15	A valuable Tree for the plains.
Red Willow (Salix Fragilis)	May 5	Nov. 5	A desirable species. Rapid growth. Wood tough and durable.
Priset (Sigustrum Amureuse)	May 12	.....	A valuable hedge plant. Holds its leaves late in winter.
Osage Orange (Maclura Aurantica)	May 5	Nov. 7	Leaves usually killed by frost. Not perfectly hardy here.
White Ash (Fraxinus Americana)	May 1	Oct. 31	A valuable species for the arid regions. Hardy and rapid grower.
Red Bud (Cercis Siliquastrum)	May 7	Oct. 25	A desirable small Tree. On trial here.
Green Ash (Fraxinus Viridis)	April 27	Oct. 31	Well adapted to cultivation in the prairie region.
Rock Elm (Ulmus Racemosa)	May 5	Nov. 5	On trial here. Seems desirable.
Golden Willow (Salix Aurea)	May 8	Nov. 7	A rapid grower. Valuable for screens.
Russian Poplar (Populus Pyramidalis)	May 3	Nov. 1	An upright Poplar of doubtful value.

Russian Poplar (Populus Bolleana)	May 5	Nov. 1	A handsome and valuable Tree for the West.
Russian Willow (Salix Acutifolia)	May 5	Nov. 5	Hardy and a free grower. Foliage rusted some.
Juneberry (Amelauchier Canadensis)	May 10	Nov. 5	Desirable ornamental Shrub. Perfectly hardy.
Russian Poplar (Populus 115)	May 1	Oct. 27	Rusts badly. Of no value.
Pea Tree (Caragana Arborescens)	May 5	Oct. 31	A very beautiful small Tree. In blossom May 7.
Russian Poplar (Populus Riga 122)	May 1	Oct. 27	Leaves rust badly. Of little value.
White Poplar (Populus Alba)	May 5	Nov. 5	Valuable for the plains region for screens and windbreaks.
American Joy (Ampelopsis Virginica)	April 22	Oct. 31	A well known Climber. Hardy and desirable.
Catalpa (Catalpa Speciosa)	April 25	Nov. 7	Desirable species when grown slowly. Leaves usually killed by frost.
Dogwood (Cornus Siberica)	May 8	Nov. 3	A beautiful Shrub. Hardy and desirable for ornamental planting.
White Mulberry (Morus Alba)	May 10	Nov. 7	The leaves are usually killed by frost early in November.
Black Ash (Fraxinus Sambucifolia)	May 5	Nov. 7	A desirable species for moist land.
Russian Willow (Salix Laurifolia)	May 5	Nov. 1	This Willow is in every way desirable for ornamental planting.
Tamarix (Tamarix Amurensis)	May 10	Oct. 20	This Tree is reasonably hardy. An acquisition.
Red Elm (Ulmus Fulva)	May 7	Nov. 5	On trial here. Seems desirable.
Chestnut (Castanea Vesca)	May 5	Oct. 27	A valuable Tree when grown slowly. Has not flowered here.
Norway Maple (Acer Platanoides)	May 7	Nov. 10	Flowers in June. Timber on trial here.
Hackberry (Celtis Occidentalis)	May 10	Nov. 10	Leaves killed by frost. A small Tree. Value here undetermined.
Small Beech (Fagus Ferrugina)	May 10	Oct. 25	On trial here.
Honey Locust (Gleditschia Triacanthos)	May 7	Nov. 1	Valuable for hedges and screens, when well pruned.
Silver Maple (Acer Dasycarpum)	May 1	Nov. 7	Flowers quite early in April. Rapid grower. Desirable for shade.
Box Elder (Acer Negundo)	May 7	Oct. 30	Desirable small Tree. Should not be planted near irrigating ditches.

CALENDAR OF TREES AND SHRUBS FOR THE SEASON OF 1888—*Concluded.*

NAME OF SPECIES.	*Leaves Formed.*	*Leaves Matured.*	REMARKS.
Asiatic Poplar (Populus Certinensis)	May 1	Oct. 30	An upright, vigorous Asiatic species. Timber valuable.
Russian Poplar (Populus Riga 24)	May 1	Nov. 3	Vigorous Poplar of undetermined value.
Russian Poplar (Populus Riga 39)	May 1	Oct. 30	Vigorous Poplar of undetermined value.

NOTES ON VEGETABLES.

Experiments with garden vegetables the past season consisted of a test of new and old varieties for earliness and of stocks from different sources for trueness to type, with a view to the production of seed in this region.

It is very important to the grower of garden vegetables, that the seeds purchased by him have been properly grown and selected, for thus only can these artificial products of man's skill be kept up to their present high state of perfection.

Deterioration in the standard of well-known varieties of garden vegetables is the result of seed selection from inferior types or the natural outcome of conversion of biennial plants into annuals, in the production of low-priced seed.

A comparison of varieties, new and old, of stocks of well-known sorts and the determination of synonyms requires time and a knowledge of the true type of each variety before much progress can be made; all of which implies a vast amount of detail of a comparative nature.

The practical results to be expected by those interested in this work, will be found in the determination and description of new and standard varieties of useful plants that thrive in our climate, and the selection of the best types of these for distribution in the several localities to which they may be best adapted. This will not be without effect on seed growers, in inducing a higher standard of excellence, in the production of the seeds they sell.

The seed stocks of the various seedmen illustrate

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in every experiment tried with them how well or how poorly selection has been practiced, emphasizing in a marked manner its importance in all seed growing the world over.

While the season just closed has been favorable to the growth of garden crops generally, it has brought with it some insect enemies new to horticulture in this region. Notably so the garden web worm (Eurycreon rantalis); the bogus chinch bug (Nysius angulatus), and the squash bug (Coreus tristis), all of which implies increased knowledge and skill on the part of those who would succeed in reaching successful results in the future.

Plant-bed cloth as a substitute for glass, manufactured by the U. S. Waterproofing Fibre Co., of New York, was used in quantity for late hot beds and cold frames the past season. We use the medium grade cloth, and however valuable this substitute may be in a moist climate, it has little value here after the first few weeks of the first season's work. It possesses the good points claimed for it for late hot bed work while it remains whole, but by early summer the cloth becomes very porous and tears so easily as to become worthless.

POTATOES.

Experiments with varieties of the potato comprised:

First—The culture of a number of named varieties and seedlings, noting their characteristics of tuber, vine and flower; also, the yield of each kind, with the purpose in view of estimating their value on a clay loam soil.

Second—The production of new varieties with the same object in view.

The test of named sorts comprised 146 varieties, most of them hitherto untried here.

The seedling varieties numbered 105 kinds, and were raised two and three years ago from natural seed produced here, and from seed sent out by the Department of Agriculture, and produced by Mr. Pringle of Vermont.

Both were planted on the same date, May 11. The area of ground devoted to these kinds was exactly one-half acre—in two separate plats of one-fourth of an acre each. The soil, a clay loam, had been in clover sod for two years previous and was plowed in the fall of 1887, and again early in the spring of 1888. The season was unfavorable owing to the lack of the usual rains in July, and to the presence of blight late in the fall. The tubers of the named kind were cut to small one eye pieces, because of having but a limited number of a kind. Of the seedlings whole sets were used in all cases.

The seedlings appeared above ground five days earlier than the named kind, which were cut to one eye sets, and had generally but one stalk to a hill. The former were much the more vigorous throughout the season, and had two to six stalks to a hill. The two stalks were irrigated on the following dates: May 28, June 11 and 26, July 5, 12 and 20, and were dug September 21. They were cultivated four times and sprayed with Paris green three times. The yield was light for reasons already given, so that an estimate of values would be misleading.

On suitable soils and in the hands of other growers, many of these seedlings equalled or excelled the product of the most profitable named kinds grown side by side. It is safe to say, however, that such varieties as proved reasonably productive this season under the conditions imposed, would on deep sandy loams produce profitable

crops of tubers. In the culture of this plant with irrigation, a suitable soil is of more importance than its fertility.

SEEDLING POTATOES AND CROSSES.

Over 500 seedling potatoes were raised this year, and planted in the open air early in June. A large proportion of these bore no tubers at all, and of such as did 100 varieties will be planted another season. A few kinds bore tubers weighing one-fourth of a pound each. Several tubers of the Mexican or Central American potato were planted uncut May 28; they grew luxuriantly and produced balls in abundance, but bore no tubers. The latter, when dug, were as perfect as the day they were planted, but soon shriveled on being exposed to the air.

The potato in tuber and vine resembles the cultivated species very closely, of which it is without doubt a wild form. One tuber of Solanum maglia was also planted. It made a vigorous growth and blossomed freely, but bore neither pollen nor tubers. It also resembles the cultivated potato, but is much less vigorous. Its flowers are white, and the trusses and individual flowers of good size.

The hybridized seed of last year was shown in the green house in April, the plants potted and set in the ground May 28. The progeny exhibited much variation in foliage, grew vigorously, but bore very few tubers and these were very small.

Seed balls have been obtained from the Solanum borele, from the Mexican potato, and from St. James II, crossed by Morton White for trial another season.

POTATOES—Named Varieties.

Name.	No. of Hills...	Length Vine, inches.....	Character of Vine.....	Condition when Dug...	When in Bloom	Color of Bloom.	Color of Tuber.	How Born in the Hill...	Yield, pounds..	Remarks.
American Giant	28	16	Spreading	Mature	July 7	White	Dull yellow	Close	14½	Tubers round, eyes deep, skin rough, rather coarse.
Arizona	10	14	Spreading	Mature	July 3	White	White	Close	6¼	.....
Agnoth's Favorite.....	8	12	Spreading	Mature	July 14	White	Dull white	Close	8	Tubers round, eyes deep, skin rough.
Boutons.....	7	14	Spreading	Mature	July 7	White	White	Close	8	Tubers round, eyes shallow, smooth skin.
Bermuda	5	16	Spreading	Mature	July 14	White	Dull yellow	Close	5	Tubers irregular, eyes shallow, skin rough.
Beauty of Hebron.....	28	18	Spreading	Dead	July 7	White	Brown	Close	25	Oblong, irregular, eyes deep, skin smooth.
Burbank	50	22	Spreading	Mature	July 7	White	White	Close	42	Tubers long, eyes deep, skin smooth.
Beauty of Sheba	42	20	Upright	Mature	No bloom	.....	Yellowish	Close	31	Tubers irregular, eyes few and shallow, skin smooth.
Blue Chenango	11	20	Spreading	Mature	July 20	Purple	Blue and purple	Close	4½	Tubers irregular, eyes deep, skin smooth.
Blue Victor	8	16	Upright	Mature	uly 14	Purple	Purple	Close	5½	Tubers irregular, eyes deep, rough skin.
Brigham	9	18	Spreading	Mature	July 14	Pink	Yellow, red spots	Close	5¾	Tubers irregular, eyes shallow, rough skin.
Big Benefit	8	18	Spreading	Mature	July 7	Purplish	Dull red	Close	5	Tubers irregular, eyes shallow, skin smooth.
Brownell's No. 55.....	10	16	Upright	Mature	July 7	White	White	Close	5	Tubers round, eyes prominent.
Baker's Imperial.....	36	16	Upright	Mature	July 3	White	Light red	Close	8½	Tubers cylindrical, eyes rather deep.
Bliss' Triumph	10	22	Spreading	Dead	July 3	White	Light red	Close	12½	Tubers irregular, eyes deep, skin smooth.
Charles Downing.....	20	20	Upright	Mature	July 14	White	White	Close	16	Oblong, eyes shallow, skin smooth.

POTATOES—NAMED VARIETIES—*Continued.*

NAME.	*No. of Hills*	*Length Vine, inches*	*Character of Vine*	*Condition when Dug*	*When in Bloom*	*Color of Bloom*	*Color of Tuber.*	*How Born in the Hill*	*Yield, pounds*	REMARKS.
Churchill's Seedling	10	22	Spreading	Mature	July 14	White	White	Close	7½	Tubers round, eyes prominent, smooth skin.
Clark's No. 1	6	18	Spreading	Dead	June 28	White	White	Close	6½	Tubers long, irregular, eyes rather deep, skin smooth.
Crandall's Seedling	18	18	Upright	Mature	July 7	White	Red, white	Close	12¾	Tubers oblong, skin smooth and spotted, eyes prominent.
Carter	10	20	Upright	Mature	July 3	White	White	Close	5	
Corliss Matchless	10	16	Spreading	Mature	July 7	White	Light red	Close	3½	
Canfield's Seedling	11	20	Spreading	Mature	July 20	White	White	Close	7	Tubers irregular, eyes prominent and shallow.
California Rose	8	18	Spreading	Mature	July 7	White	Light red	Close	6½	Tubers oblong, eyes deep, skin smooth.
Cuyahoga	48	18	Upright	Mature	July 14	White	Light red	Close	30	Tubers oblong, eyes deep and of a darker shade than the skin.
Chicago Sun	6	16	Spreading	Mature	July 14	White	White	Close	4	Tubers oblong, eyes shallow, skin smooth.
Champion of America	10	20	Spreading	Mature	July 10	White	Pink	Close	7	Tubers round, skin smooth, eyes deep, color red.
Collum's Superb	13	20	Upright	Green	July 14	Light purple	White	Close	9	Tubers long, irregular, skin smooth, eyes prominent.
Chicago Market	36	20	Spreading	Dead	June 28	White	Light red	Close	30	Tubers irregular, eyes shallow, skin smooth.
California White	6	16	Spreading	Mature	July 20	White	Dull white	Close	3¾	Tubers irregular, eyes shallow, skin smooth.
Cream of the Field	6	20	Spreading	Mature	July 7	White	White	Close	7	Tubers irregular, eyes deep, skin smooth.
Cook's Superb	6	20	Spreading	Mature	July 14	White	Dull white	Close	6	Tubers round, deep eyes, fair size.
Charles I	10	16	Spreading	Mature	July 14	White	Light red	Close	6½	Irregular, skin smooth, eyes deep.

Climax	6	18	Spreading	Mature	July 14	White	Dull white	Close	5½	Tubers round, eyes deep, skin rough.
California Orange	5	18	Upright	Mature	July 14	White	White	Close	6½	Tubers round, eyes deep, rough skin.
California Red	12	20	Spreading	Mature	July 14	White	Light red	Close	10½	Tubers irregular, eyes deep, skin rough.
Durham	7	16	Spreading	Mature	July 14	White	Light rose	Close	7½	Tubers irregular, eyes shallow, skin smooth.
Dakota Red	32	20	Spreading	Green	July 20	Pale purple	Reddish brown	Close	17	Tubers irregular, skin rough, eyes deep.
Domaine	40	16	Spreading	Mature	July 7	White	Pale brown	Close	29	Tubers oblong, eyes deep, skin smooth.
Dictator	7	20	Spreading	Mature	July 7	White	Yellow	Close	6	Tubers round, eyes deep, smooth skin.
Davis Seedling	11	18	Spreading	Mature	July 14	Purple	Red	Close	8	Tubers round, eyes deep, skin rough.
Delaware	30	20	Spreading	Mature	July 10	White	White	Close	25	Tubers flat, irregular, skin smooth, eyes shallow, fine.
Early Howard	7	20	Upright	Mature	July 7	White	White	Close	5	Tubers oblong, eyes deep, skin smooth, fair tubers.
Early Prolific	6	18	Spreading	Mature	July 7	White	White	Close	7	Tubers long, irregular, eyes deep, smooth skin.
Early Sunrise	30	18	Spreading	Mature	July 7	White	Red brown	Close	18	Tubers irregular, eyes deep, skin smooth.
Early Excelsior	5	16	Upright	Green	July 7	White	White	Close	1½	Tubers irregular, eyes deep, skin rough, worthless.
Early Electric	10	20	Upright	Mature	July 7	White	Light red	Close	6½	Tubers round, eyes shallow, dark red, skin smooth.
Early Albion	10	18	Upright	Mature	June 28	White	White	Close	8¼	Tubers oblong, eyes deep, skin rough.
Early New Zealand	8	20	Spreading	Mature	July 14	Purple	Pale red	Close	8	Tubers long, eyes shallow, skin smooth.
Early Telephone	10	18	Spreading	Mature	July 7	White	Dull White	Close	5	Tubers oblong, eyes shallow, skin smooth.
Early Perfection	8	18	Upright	Mature	July 7	Pink	Red	Close	7	Tubers long, eyes shallow, good tubers.
Early Jinks	5	18	Spreading	Dead	June 28	White	White	Close	6¼	Tubers oblong, irregular, eyes deep, skin smooth.
Early Pearl	52	20	Upright	Dead	July 7	Purple	Red	Close	33	Tubers round, eyes deep, skin smooth.
Early Ohio	20	18	Spreading	Mature	July 14	Pink	Dull White	Close	18½	Tubers roundish, skin rough, a desirable early variety.
Early Case	35	18	Upright	Mature	July 14	Lilac	Pale Red	Close	17¾	Tubers roundish, flat, eyes deep, skin smooth.

POTATOES—NAMED VARIETIES—*Continued.*

NAME.	*No. of Hills*	*Length Vine, inches*	*Character of Vine*	*Condition when Dug*	*When in Bloom*	*Color of Bloom*	*Color of Tuber.*	*How Born in the Hill*	*Yield, pounds*	REMARKS.
Early Puritan	10	20	Upright	Mature	July 7	White	White	Close	10	Tubers oblong, eyes deep, skin fairly smooth.
Early Sunrise	45	20	Upright	Mature	June 28	White	Pale red	Close	30	Tubers long and tapering, eyes deep, skin smooth.
Early Snowflake	8	18	Spreading	Mature	July 7	White	White	Close	4	Tubers round, eyes shallow, skin smooth.
El Paso	11	16	Spreading	Mature	July 14	Pink	Dull yellow	Close	9	Tubers round, eyes shallow, color pink, skin smooth.
Early Maine	11	18	Spreading	Mature	July 7	White	Light red	Close	11	Tubers oblong, skin smooth, eyes shallow, good tubers.
Empire State	54	18	Spreading	Mature	July 10	White	White	Close	36	Tubers long, skin smooth, eyes deep.
Fearnaught	62	18	Spreading	Mature	July 14	White	White	Close	52½	Tubers irregular, eyes deep, skin smooth, good.
Farina	8	16	Upright	Mature	July 11	White	White	Close	8	Tubers long, eyes shallow, smooth skin.
Green Mountain	65	20	Spreading	Mature	July 14	White	White	Close	37	Tubers irregular, eyes deep, skin rough.
Golden Flesh	24	18	Upright	Mature	July 20	Purple	Dark purple	Close	11	Tubers irregular, eyes deep, skin rough, poor tubers.
Gold Flake	6	18	Spreading	Mature	July 14	White	Whitish yellow	Close	8	Tubers round, eyes shallow, skin smooth and spotted.
Golden Age	9	18	Spreading	Mature	July 14	White	White	Close	5	Tubers long, eyes deep, skin smooth.
Grange	9	18	Spreading	Mature	July 11	White	Dull white	Close	12	Tubers round, eyes deep and rich, skin smooth.
Hercules	10	16	Spreading	Mature	July 14	Light purple	Light red	Close	7½	Tubers long, eyes shallow, skin smooth.
Howard	10	18	Spreading	Mature	July 3	White	White	Close	9½	Tubers long, eyes shallow, good tubers.
Hampshire Beauty	38	16	Upright	Mature	July 14	White	White	Close	24	Long, eyes shallow, smooth skin.

Hoag's Seedling	40	20	Spreading	Mature	July 14	White	White	Close	25	Tubers long, tapering to seed end, eyes shallow.
Irish Champion	5	18	Spreading	Mature	July 20	White	Dull white	Close	4	Tubers round, skin smooth, eyes deep.
Iroquois	9	18	Spreading	Green	July 20	White	Dull white	Close	7	Tubers round, eyes deep, fairly smooth skin.
Irish Cup	6	18	Upright	Green	July 14	Light purple	Dark red	Close	1	Worthless.
Imperial Cow Horn	6	18	Spreading	Mature	July 14	Purple	Purple	Close	3¼	Tubers long, eyes shallow, skin rough.
Jordan's Russet	10	20	Spreading	Mature	July 7	White	White	Close	11¾	Tubers irregular, eyes deep
Junkers	10	18	Spreading	Mature	July 3	White	White	Close	10½	Tubers long, skin smooth, eyes shallow, fine.
Late Ohio	7	18	Spreading	Mature	July 14	White	Pale brown	Close	5¾	Tubers oblong, eyes shallow and red, skin smooth.
Late Snowflake	7	18	Spreading	Mature	July 14	White	Yellow white	Close	4½	Tubers irregular, roundish eyes, deep.
Leopard	7	18	Spreading	Mature	July 14	Purple	Purple white	Close	4	Tubers round, eyes deep, skin smooth and spotted.
Lady Finger	20	18	Spreading	Mature	July 14	White	White	Close	4½	Tubers long, eyes deep, skin smooth.
Ladies' Favorite	10	20	Spreading	Mature	July 14	White	White	Close	6	Tubers round, eyes shallow, skin smooth, fine tubers.
Lion	8	18	Spreading	Mature	July 14	Light purple	Red	Close	5½	Tubers oblong, eyes deep, color red.
Michigan Late Rose	11	18	Spreading	Mature	July 14	White	Yellow red	Close	12	Tubers irregular, roundish eyes, prominent.
Mayflower	43	20	Upright	Green	July 7	White	White	Close	26	Tubers roundish, flat.
Maine Champion	8	18	Spreading	Mature	July 14	Pink	Dull white	Spreading.	6	Tubers round, eyes shallow, skin smooth.
Mammoth Pearl	28	24	Spreading	Mature	July 10	White	White	Close	22	Tubers roundish, flattened, eyes few.
Mullaly's White	8	16	Spreading	Mature	July 14	White	White	Close	7	Tubers irregular, eyes deep, skin rough.
Magnum Bonum	6	14	Spreading	Mature	July 14	White	Rose	Close	5	Tubers irregular, eyes deep, rough skin.
New Champion	9	18	Spreading	Mature	July 14	Lilac	Dull white	Close	10	Tubers round, flat eyes, deep skin, smooth.
New Eximus	10	14	Spreading	Mature	July 14	White	Yellowish	Close	8½	Tubers round, skin rough, eyes deep.
Newton	11	16	Spreading	Mature	July 14	White	Rose	Close	7½	Tubers irregular, eyes shallow, rough skin.

POTATOES—NAMED VARIETIES—*Continued.*

NAME.	No. of Hills	Length Vine, inches	Character of Vine	Condition when Dug	When in Bloom	Color of Bloom	Color of Tuber	How Born in the Hill	Yield, pounds	REMARKS.
Norman White Rose	8	20	Spreading	Mature	July 14	White	Rose	Close	7	Tubers roundish flat, eyes shallow, desirable.
O. K. Mammoth	28	18	Spreading	Mature	No bloom		Yellow	Close	17	Tubers irregular, skin smooth, eyes deep.
Ohio Queen	7	16	Spreading	Mature	July 14	White	White	Close	2	Tubers oblong, skin smooth, nearly a failure.
Ohio Fancy	10	18	Spreading	Mature	July 7	White	Yellow	Close	10	Tubers round, eyes deep, skin rough.
Paragon	10	12	Spreading	Mature	July 7	White	White	Close	5	
Perfect Peachblow	10	20	Upright	Mature	July 7	Lilac	Red and White	Close	5¼	Tubers irregular, skin spotted, desirable.
Putnam	10	18	Upright	Green	July 14	White	White	Close	7½	Tubers irregular, eyes deep, skin rough.
Portage	6	16	Upright	Mature	July 7	White	White	Close	3½	Tubers oblong, eyes shallow, desirable.
Pride of America	9	18	Spreading	Mature	July 14	White	White	Close	9	Tubers long, eyes prominent, skin rough.
Pride of the West	7	20	Spreading	Mature	No bloom		Yellow	Close	6	Tubers roundish, smooth, eyes deep.
Pride of Japan	6	18	Spreading	Mature	July 10	White	Dull White	Close	3	Tubers round, eyes deep skin smooth.
President Cleveland	15	20	Spreading	Mature	July 7	White	Dull White	Close	9	Tubers roundish flat, skin smooth.
Pride of Ireland	9	18	Spreading	Mature	July 14	White	Dull White	Close	8½	Tubers round, eyes deep, skin smooth.
Pearl of Savoy	55	20	Spreading	Dead	July 7	White	Pale Red	Close	35	Tubers oblong, eyes deep, skin smooth
Purple Blush	7	18	Spreading	Mature	July 14	Purple	Pale Purple	Close	7	Tubers irregular, eyes shallow, skin spotted.
Putnam's New Rose	11	20	Spreading	.....	.....	.....	.....	.....	5	.....

Povtateuk	11	20	Spreading	Mature	July 14	White	.....	.....	....	.....
Queen of the Valley	61	20	Upright	Mature	July 14	White	.....	.....	....	.....
Queen of Roses	9	20	Spreading	Dead	July 7	White	Pale rose	Close	9	Tubers long, pointed at seed end, eyes deep.
Rand's 42	10	20	Upright	Mature	July 7	White	White	Close	9	Tubers irregular, eyes deep.
Rochester Favorite	12	18	Spreading	Mature	June 28	Pink	Rose	Close	9	Tubers oblong, eyes prominent, skin smooth.
Red Elephant	8	20	Spreading	Dead	July 14	White	Red	Close	15	Tubers irregular, eyes deep.
Rose's Seedling	18	20	Spreading	Mature	June 28	White	White and red	Close	8	Tubers irregular, eyes deep, skin spotted red.
Rural Blush	39	16	Spreading	Dead	July 7	White	Pink	Close	30	Tubers roundish, eyes deep.
Rosy Morn	7	18	Spreading	Mature	July 14	White	Rose	Close	7	Tubers irregular, eyes shallow, skin smooth.
Rubicana	11	14	Spreading	Mature	July 14	Blue	Red	Close	8¾	Tubers round, eyes deep, skin rough.
Rose's Beauty	29	20	Upright	Mature	July 10	White	Pale rose	Close	26¾	Tubers irregular, eyes deep, a desirable kind.
Randall's Rose	44	20	Spreading	Mature	July 3	White	Pale rose	Close	36	Tubers oblong, eyes shallow, skin smooth.
Red Star	32	20	Spreading	Mature	July 10	White	.....	.....	17	.....
St. Patrick	43	16	Spreading	Mature	July 7	White	White	Close	32	Tubers oblong, eyes deep, skin rough.
Sterling	8	14	Spreading	Dead	June 28	White	White	Close	5½	Tubers irregular, eyes shallow, skin smooth.
Stray Beauty	22	18	Spreading	Mature	No	bloom	Rose	Close	30	Tubers round, eyes deep, desirable.
Summit	22	20	Spreading	Mature	July 7	White	Red	Close	24	Tubers oblong, eyes prominent, fine.
Superb Beauty	6	16	Spreading	Dead	June 28	White	Red	Close	6	Tubers oblong, eyes few and deep, skin smooth.
Spaulding	9	16	Upright	Mature	July 7	White	Dull white	Close	6½	Tubers round, eyes shallow, desirable.
Steuben Beauty	9	18	Spreading	Mature	July 14	Pink	Rose	Close	6	Tubers round and coarse.
Seek no Further	6	20	Spreading	Mature	July 14	White	Rose	Close	5	Tubers oblong, eyes deep, skin smooth.
Shannon's Seedling	12	16	Upright	Dead	July 14	Pink	White	Close	9	Tubers round, eyes shallow, desirable.

POTATOES—NAMED VARIETIES—*Continued.*

NAME.	No. of Hills	Length Vine, Inches	Character of Vine	Condition when Dug	When in Bloom	Color of Bloom	Color of Tuber	How Born in the Hill	Yield, pounds	REMARKS.
Snowflake	11	18	Spreading	Dead	June 28	White	White	Close	7	Tubers round, eyes shallow, skin smooth.
Seneca Chief	9	20	Spreading	Dead	July 7	White	.....	.....	7	.....
Thorburn	7	18	Spreading	Dead	June 28	White	White	Close	9	Tubers irregular, eyes deep, skin spotted.
Trimaxis	15	18	Spreading	Dead	July 7	White	White	Close	5¾	Tubers irregular, skin rough, eyes deep.
Tremont	8	20	Spreading	Dead	July 7	White	White	Close	5½	Tubers round, eyes shallow.
Thunderbolt	52	20	Upright	Dead	July 7	White	White	Close	35	Tubers round, eyes shallow, skin smooth.
Vanguard		..	Spreading	Dead	July 7	White	Dull White	Close	35	Tubers pointed at seed end, eyes shallow.
Vermont Champion	12	18	Spreading	Mature	June 28	White	Dull White	Close	9	Tubers oblong, eyes deep, skin smooth.
White Elephant	10	24	Spreading	Mature	July 7	Purple	White, Red Spots	Close	8	Tubers long, eyes deep, skin smooth.
White Mercer	9	20	Spreading	Mature	July 7	White	White and Red	Close	5½	Tubers irregular, eyes deep and red, skin smooth.
White Beauty of Hebron	6	20	Spreading	Mature	July 14	White	White	Close	7	Tubers irregular, eyes deep, rather coarse
White Boston Market	10	18	Spreading	Mature	July 14	White	White	Close	3½	Tubers long, eyes shallow, skin smooth.
Welds	18	18	Spreading	Mature	July 7	White	Pale Red	Close	10	Tubers roundish, eyes deep, rough.
Watson's Seedling	39	20	Spreading	Dead	June 28	White	Rose	Close	22	Tubers irregular, eyes prominent.
White Prolific	37	20	Spreading	Mature	July 14	.....	.....	.....	....	.....

White Sport	28	18	Upright	Mature	July 7	White	White	Close	13	Tubers round, eyes deep, skin rough.
White Star	32	18	Spreading	Dead	July 7	White	White	Close	22	Tubers cylindrical, eyes deep, skin rough.
Yankee Nation	19	15	Upright	Mature	July 7	White	White and Red	Close	7	Tubers cylindrical, eyes deep, skin rough.

POTATOES—SEEDLINGS.

No. of Variety	No. of Hills	Length Vine, inches	Character of Vine	Condition when Dug	When in Bloom	Color of Bloom	Color of Tuber	How Born in the Hill	Yield, pounds	Remarks.
1	10	26	Spreading	Mature	June 28	White	White	Close	16	Tubers oblong, smooth, eyes shallow, fine.
2	10	16	Spreading	Dead	July 7	White	White	Close	12	Tubers irregular, eyes deep.
3	10	14	Upright	Mature	July 7	Purple White	Light Red	Close	9½	Tubers roundish, flat, smooth, eyes deep.
4	10	19	Upright	Mature	June 3	White	Pale Brown	Close	9	Tubers roundish, flat, fairly smooth, eyes shallow.
5	10	20	Upright	Dead	July 7	Blue White	Blue	Close	7	Tubers oblong, rather smooth, eyes shallow.
6	10	18	Upright	Mature	July 7	Purple	Purple Red	Close	5½	Tubers oblong, skin rough, eyes deep.
7	10	14	Upright	Dead	July 3	White	Pink White	Close	10	Tubers long, slender, eyes small and deep, prolific.
10	10	16	Upright	Dead	No bloom		Blue	Close	6½	Tubers oblong, irregular, eyes deep, poor.
11	10	20	Upright	Green	July 7	White	White	Close	12	Tubers long, smooth, eyes few, shallow, good.
12	10	18	Upright	Green	July 7	Purple	Purple White	Close	7½	Tubers long and smooth, eyes many, deep.
13	10	18	Upright	Mature	July 3	White	Dull White	Close	5⅛	Tubers smooth, eyes medium deep.
15	10	18	Upright	Mature	July 7	White	Dull White	Close	7½	Tubers oblong, irregular, eyes medium deep.
18	10	20	Upright	Dead	July 6	Wnite	Dull White	Close	6½	Tubers, irregular, eyes deep.
19	10	18	Upright	Mature	July 7	White	Dull White	Close	5⅛	Tubers roundish, eyes deep, skin rough.
20	10	14	Upright	Green	No bloom		Reddish White	Close	3½	Tubers irregular, eyes deep, skin smooth.
21	10	18	Upright	Mature	July 5	White	White	Close	6½	Tubers roundish, rough, eyes deep.

22.....	10	16	Upright	Mature	July 7	White	Pink white	Close	3½	Tubers oblong, a poor variety this year.
23.....	20	20	Upright	Mature	July 3	White	Dull white	Close	4½	Tubers oblong, pointed at seed end, eyes shallow.
24.....	10	12	Upright	Green	July 7	White	Dull white	Close	6½	Tubers oblong, rough, eyes deep.
25.....	10	22	Upright	Green	July 3	Purple	Purple red	Close	11½	Tubers smooth, eyes medium deep.
26.....	10	18	Upright	Mature	June 28	Purple	Blue	Close	3	Tubers roundish, eyes deep, poor.
27.....	10	12	Upright	Mature	July 3	Purple	Blue	Close	2¾	Tubers oblong, small and undesirable.
28.....	10	16	Upright	Mature	July 7	White	White	Close	8	Tubers oblong, smooth, eyes shallow.
29.....	10	12	Upright	Dead	July 28	Pink	Light blue	Close	8	Tubers long, flattened, smooth, eyes prominent.
30.....	10	12	Spreading	Dead	July 7	Pink	White	Close	8¾	Tubers oblong, smooth, eyes shallow.
31.....	10	18	Upright	Mature	July 3	White	Brown	Close	14¾	Tubers long, smooth, eyes shallow, desirable.
32.....	10	18	Upright	Mature	June 28	White	Dull white	Close	10½	Tubers irregular, eyes shallow and few.
33.....	10	20	Upright	Green	July 3	White	Dull white	Close	12	Tubers oblong, smooth, eyes shallow.
34.....	10	24	Upright	Green	July 3	White	Dull white	Close	12¼	Tubers oblong, eyes few, shallow, fine.
35.....	10	12	Upright	Dead	June 28	Purple	Purple white	Close	7¼	Tubers oblong, flat, eyes shallow, skin smooth.
36.....	10	12	Upright	Dead	June 28	White	Purple white	Close	8½	Tubers roundish, flat, smooth, desirable.
37.....	10	16	Spreading	Dead	July 7	White	Purple white	Close	13	Tubers roundish, irregular, eyes few, desirable.
38.....	10	14	Spreading	Dead	July 7	Purple	Pu ple	Close	18	Tubers oblong, eyes deep, prolific.
39.....	10	12	Upright	Mature	July 3	White	White	Close	5½	Tubers irr gular, eyes deep, rather rough.
40.....	10	16	Upright	Dead	July 3	Blue	Blue	Close	5¾	Tubers irregular, poor.
41.....	10	18	Upright	Dead	July 7	Pink	Pink	Close	5	Tubers oblong, eyes deep, poor.
42.....	10	18	Spreading	Dead	July 3	Purple	Purple	Close	12	Tubers long, eyes deep, prolific.
43.....	10	20	Upright	Dead	June 28	White	White	Close	13½	Tubers oblong, smooth, desirable.

POTATOES—SEEDLINGS—*Continued.*

No. of variety.	No. of Hills	Length Vine, inches.	Character of Vine.	Condition when Dug	When in Bloom	Color of Bloom	Color of Tuber	How Born in the Hill.	Yield, pounds.	REMARKS.
44.....	10	20	Upright	Dead	July 3	Lilac	Blue	Close	19½	Tubers long, rather rough, prolific.
46.....	10	14	Upright	Mature	July 7	Lilac	Blue	Close	7	Tubers irregular, eyes deep, poor.
47.....	10	18	Upright	Mature	July [illegible]	White	Brown	Close	6¼	Tubers roundish, irregular, eyes deep, skin smooth.
48.....	10	12	Upright	Mature	July 3	White	Purple white	Close	7½	Tubers oblong, smooth, desirable.
49.....	10	12	Spreading	Dead	July 7	Pink	Dull white	Spreading.	8¾	Tubers roundish flat, skin smooth, fine.
50.....	10	16	Upright	Dead	July 7	Purple	Blue	Close	5¾	Tubers roundish, eyes deep, rough.
51.....	10	18	Upright	Dead	June 28	White	Pale brown	Close	12½	Tubers oval, eyes deep, rough.
52.....	10	18	Upright	Mature	July [illegible]	White	Dull white	Close	15½	Tubers smooth, eyes medium deep, desirable.
53.....	10	20	Upright	Green	July 10	Pink	Red	Close	7	Tubers irregular, eyes deep.
54.....	10	12	Upright	Mature	June 28	White	Dull white	Close	2¾	Tubers cylindrical, poor this season.
55.....	10	14	Upright	Dead	June 28	White	Rose	Close	6½	Tubers irregular, eyes deep.
56.....	10	20	Upright	Green	July 7	Blue	Blue	Close	6¾	Tubers long, smooth eyes, medium deep.
57.....	10	14	Upright	Dead	July 3	Blue	Blue	Close	6½	Tubers oblong, rather raugh, eyes deep.
58.....	10	18	Upright	Dead	July 3	White	White	Close	16¼	Tubers cylindrical, eyes deep, fine.
59.....	10	10	Upright	Mature	July 3	White	White	Close	5½	Tubers oblong, eyes few and shallow.
61.....	10	18	Upright	Mature	July 3	Purple	Purple	Close	6¾	Tubers roundish, eyes medium deep.

62	10	14	Upright	Dead	July 3	White	Reddish white	Close	10½	Tubers long and smooth, eyes few, desirable.
63	10	20	Upright	Mature	July 3	Pink	Dull white	Close	10	Tubers roundish, irregular, good.
64	10	12	Upright	Mature	No bloom		Dull white	Close	6¼	Tubers oblong, smooth, desirable.
65	10	14	Upright	Mature	July 3	Purple	Purple	Close	11	Tubers long, smooth, desirable.
66	10	12	Upright	Green	July 7	White	White	Close	7	Tubers oblong, flattened, good.
67	10	12	Upright	Mature	July 7	Whitish	Purple white	Close	3½	Tubers roundish, flat, a failure this season.
68	10	26	Upright	Green	July 6	White	Pale red	Close	14	Tubers roundish, flat, desirable.
69	10	18	Upright	Mature	July 7	Purple	Purple	Close	12	Tubers rough, eyes deep, prolific.
70	10	18	Upright	Mature	July 3	Whitish	Rose	Close	8	Tubers irregular, eyes shallow, desirable.
71	10	18	Upright	Green	July 7	White	White	Close	8	Tubers roundish, smooth, desirable.
72	10	10	Spreading	Dead	June 28	White	White	Close	20½	Tubers cylindrical, smooth, desirable.
73	10	18	Upright	Mature	July 7	Purple	Purple	Close	9	Tubers oblong, smooth, desirable.
74	10	12	Upright	Dead	July 7	Purple	Purple	Close	10	Tubers irregular, eyes shallow, good.
75	10	16	Spreading	Dead	June 28	Purple	Purple	Close	13¾	Tubers irregular, eyes shallow, good.
76	10	18	Upright	Dead	July 6	White	White	Close	5¼	Tubers irregular, eyes deep.
77	10	16	Upright	Dead	June 28	White	White	Close	14	Tubers long, smooth, desirable.
78	10	12	Upright	Mature	July 3	White	Pale red	Close	4½	Tubers oblong, eyes deep.
79	10	16	Upright	Mature	July 7	White	White	Close	5¾	Tubers oblong, smooth, eyes shallow.
80	10	16	Upright	Green	July 3	White	White	Close	10	Tubers roundish, eyes few, desirable.
81	10	18	Upright	Green	July 3	White	White	Close	8	Tubers roundish, eyes deep.
82	10	16	Spreading	Dead	July 7	White	White	Close	18	Tubers oblong, smooth, prolific.
83	10	18	Upright	Green	July 3	White	Reddish white	Close	7	Tubers oblong, smooth, eyes medium deep.

POTATOES—SEEDLINGS—*Concluded.*

No. of Variety	No. of Hills	Length Vine, inches	Character of Vine	Condition when Dug	When in Bloom	Color of Bloom	Color of Tuber	How Born in the Hill	Yield, pounds	REMARKS.
85	10	14	Upright	Mature	July 7	White	White	Close	9½	Tubers irregular, eyes deep.
87	10	18	Upright	Mature	July 7	White	White	Close	7½	Tubers oblong, eyes medium deep.
88	10	12	Upright	Mature	July 7	Lilac	Purple white	Close	15¾	Tubers oblong, smooth, desirable.
89	10	18	Upright	Green	July 7	White	White	Close	4½	Tubers irregular, rather rough.
90	10	18	Upright	Mature	July 3	White	Dull White	Close	4¼	Tubers oblong, smooth, eyes few.
91	10	18	Upright	Dead	July 7	Purple	Purple	Close	14¾	Tubers roundish, smooth, eyes few and shallow.
92	10	16	Spreading	Dead	July 3	White	White	Close	9½	Tubers oblong, smooth, eyes shallow, desirable.
93	10	16	Upright	Mature	July 3	Pink	Pale Red	Close	5	Tubers oblong, eyes deep, poor.
94	10	18	Upright	Green	July 7	White	White	Close	11¾	Tubers long, slender, smooth.
95	10	22	Spreading	Green	July 7	White	White	.....	0	Produced no tubers.
96	10	16	Upright	Dead	June 28	White	White	Close	7	Tubers irregular, eyes deep.
98	10	12	Upright	Mature	July 7	Purple	Purple	Close	11½	Tubers irregular, eyes deep, prolific.
99	10	12	Spreading	Dead	June 28	White	White	Close	6¼	Tubers irregular, eyes deep.
100	10	14	Upright	Dead	July 7	White	White	Close	7	Tubers oblong, eyes deep, rather rough.
101	10	24	Spreading	Green	July 10	White	White	Close	9	Tubers slender, oblong, smooth, eyes few.
102	10	12	Spreading	Mature	July 3	White	White	Close	16	Tubers oblong, smooth, eyes few, good.

103.....	10	14	Spreading	Mature	July 3	White	White	Close	7	Tubers oblong, smooth, eyes few.
104.....	10	16	Upright	Mature	July 3	White	White	Close	6	Tubers roundish, eyes shallow.
105.....	10	16	Spreading	Mature	July 3	White	Pink	Close	17	Tubers irregular, eyes shallow, desirable.

ONIONS.

Seeds of nineteen varieties of the onion were sown March 15, in rows twelve inches apart, on a piece of clay loam soil, having an area of 29 perches, and a somewhat abrupt slope off to the west. Previous to sowing the plat had to be irrigated owing to lack of moisture in the soil, to germinate the seed. The patch was irrigated on May 8 and 21; June 2, 15 and 30; July 10 and 23; August 4 and 20. The plants were cultivated after each irrigation and hand weeded three times.

The total yield of all the varieties and duplicates was 4,506 pounds of merchantable bulbs.

No thinning of plants in the rows was practiced, and is usually unnecessary unless very large bulbs are desired.

The heaviest yields are obtained by ordinary sowing and no thinning.

The points in onion culture are pretty much the same everywhere, and are as follows:

First—Rich open soil, that will nor bake after irrigation.

Second—Good seed.

Third—Early sowing.

Fourth—Such culture and irrigation as will induce a rapid and continuous development of the plants during the season of growth.

VARIETIES.

The varieties that succeed best on a great variety of soils are the two forms of the Danvers, the Cracker, Early Red, Red Weathersfield and Queen White. Onions like the Portugal do no not often mature naturally here, hence are poor keepers, unless grown on very congenial soils.

Of new varieties we are pleased with No. 20 Golden Ball, of Landreth & Sons. It is a very large showy onion of the Bocca type, the best of the Italian vaieties for this climate.

Red Bassano, sent out by Burpee & Co., resembles the Red Wethersfield, but is much earlier to ripen. It is a large, flat, irregular, purplish red bulb, and seems to be a desirable variety.

The finest stock and largest yield of Yellow Globe Danver was No. 30, sold by Aaron Low & Co.

The commission seed of the Sioux City Seed Company was very good, comparing favorably with the best from other sources. No. 10 Early Globe is a desirable variety; it is the original type of the Red Wethersfield, but unlike that variety now in form and color.

Notes are grouped in the following table :

ONIONS.

No.	Name.	Of Whom Purchased.	Yield of 115 of row—lbs.	Estimated yield per acre—bushels	Remarks.
1	White Garganus	Hend. & Co.	65	433.25	A small-topped, desirable early onion.
2	Extra Early Red	Hend. & Co.	110	731.07	Bulbs flat, regular in shape, very early, good stock.
3	Yellow Globe Danvers	Hend. & Co.	126	837.20	Bulbs flat and spherical, uniform in size.
4	Large Red Wethersfield	Hend. & Co.	110	731.07	Bulbs large, spherical and flat, late, good stock.
5	Yellow Dutch	Hend. & Co.	80	532.28	Bulbs mostly flat, many scallions.
6	Southport White Globe	Hend. & Co.	103	685.29	Bulbs globular, uneven in size, not a keeper.
7	Yellow Danvers	Ferry & Co.	68	421.29	A medium stand of very inferior stock.
8	Large Red Wethersfield	Ferry & Co.	125	832.05	A good stand, but very late to ripen, bulbs mostly flat.
9	Yellow Danvers	Sioux City Seed Co	90	598.47	A medium stand, stock good, bulbs mostly roundish.
10	Early Red Globe	Sioux City Seed Co	132	877.40	A good stand, stock uniform, bulbs globular, color pale red.
11	Large Red Wethersfield	Sioux City Seed Co	73	485.19	Stand medium, stock very good.
12	Silver Skin	Sioux City Seed Co	128	850.51	Bulbs flat, a good stand, bottomed poorly.
13	Silver Skin	Land. & Son.	103	655.29	Bulbs uneven in size and shape, bottomed poorly.
14	Early Red	Land. & Son.	84½	560.17	Bulbs flat and uniform, very early.
15	Yellow Globe Danvers	Land. & Son.	105	698.03	Bulbs mostly spherical, stand fair, good stock.
16	Round Y. Danvers	Hend. & Co.	126¼	839.13	Bulbs not uniform in shape, stand excellent.

17....	Silver Skin.....	Hend. & Co	136	904.29	Bulbs, not uniform, stand good, but few ripening.
18....	Southport Y. Globe..... ...	Hend. & Co	85¼	570.54	Bulbs, globular, many scallions, did not mature.
19....	La. Red Wethersfield.....	Land. & Son.....	20	133.00	Stand poor, stock good, seed of inferior vitality.
20....	Golden Ball.....	Land. & Son.....	89¼	593.39	An Italian variety of merit, bulbs spherical, showy.
21....	White Bermuda	Land. & Son.....	3		Seed germinated poorly.
22....	Pale Red Bermuda.....	Land. & Son.....	58	386.06	Bulbs small, very early, color pale red.
23....	Yellow Danvers (flat)..... ...	Ferry & Co.....	111	739.08	Bulbs flat and round, good stock, but late.
24....	Yellow Globe Danvers.....	Sioux City Seed Co	107	712.27	Bulbs mostly roundish, good stock.
25....	El Paso.....	Sioux City Seed Co	112	745.30	Stand good, none matured.
26....	Silver King.....	Sioux City Seed Co	110	731.08	Bulbs large, very flat, matures early, skin white.
27....	Early Bloomsdale.....	Land. & Son.....	108	718.43	A good stand, none matured.
28....	Red Bassano.....	Burpee	117	778.27	Bulbs large, purplish red, a desirable variety.
29....	Danvers Ro. Yellow.....	Low	150	997.27	Bulbs mostly round, very superior stock.
30 ..	Early Cracker.	Low	110	731.07	Bulbs mostly flat, very early, resembles Yellow Danvers.
31....	Silver King.....	Low	120	799.01	Bulbs very large, skin white.

PEAS.

A comparative test of thirty-seven varieties of the garden pea was made for earliness, yield and availability for this region. The seed was sown May 1, in drills three feet apart, on a third of an acre of ground. Some of the kinds were badly infested with weevil at planting, which affected the stand unfavorably. The first to appear above ground were the forms of variety Daniel O'Rourke, Hosford's Market Garden, Pride of the Market, Abundance, Blue Beauty and Tom Thumb.

The varieties that had not appeared above ground at this time were John Bull, Kentish, Ivicta, American Champion, Eugenia and Everbearing.

The earliest to develop fruit were Daniel O'Rourke and Henderson's First and Best, being fit for table use in forty-nine days from planting; Alpha and Premium following in fifty-seven days.

The latest varieties were Sanders, Marrow, Abundance, John Bull, Blue Imperial and Yorkshire Hero.

The varieties longest in fruit of the late kinds were the Champion of England, Blue Imperial and Yorkshire Hero.

The varieties that pleased us best were Henderson's First of All and Laxton's Alpha; the earliest wrinkled variety, Hosford's Market Garden, Eugenia, Stratagem, Abundance and Champion of England.

The most prolific variety was Eugenia, a second early white wrinkled kind of good quality; next Laxton's Charmer, Champion of England and Pride of the Market.

The pea vine loves a cool temperature, but mildews badly in hot weather and on shallow soil too rich for them.

The smooth round varieties may be sown early in April in this region.

Successional plantings need not be made during the season; a continued supply may be had by sowing early, medium and late kinds at one time.

Notes are grouped in the appended table.

PEAS.

NAME.	Of Whom Purchased.	When in Bloom.....	Fit for Market.....	Seeds Ripe on.	Length of vine Inches.....	Average length of Pod, Inches.....	Average No. of Seeds in Pods.	Average No. of Pods on Vine.	Weight of Pea on 6 Vines, Ounces.....	Yield of fifty feet of row,..	REMARKS.
Sanders Marrow.....	Hend. & Co	July 10	Aug. 1	Aug. 24	36	2½	6	10	3¾	46¾	A late variety, medium prolific, medium quality.
Yorkshire Hero.....	Hend. & Co.	July 1	July 24	Aug. 21	30	4	7	8	4¼	53⅛	A wrinkled variety, prolific and of excellent quality.
Blue Beauty.....	Hend. & Co.	June 12	June 26	Aug. 20	14	2½	4	7	2¼	18¾	A dwarf, smooth seeded variety, of no particular merit.
Hoesf'ds M'k't Garden	Hend. & Co.	June 10	July 4	Aug. 5	14	2½	4	7	2½	31¼	A wrinkled variety of merit, seeds large.
Blue Imperial.....	Hend. & Co.	June 28	July 24	Aug. 26	24	2¼	4	10	3¼	40	A smooth seeded variety, undesirable.
Abundance.....	Hend. & Co.	June 24	July 30	Aug. 28	24	2¼	6	16	3¾	46¾	A large seeded, wrinkled variety of great merit.
Champion of England..	Hend. & Co.	June 15	July 4	Aug. 28	48	3½	6	14	4½	56¼	A standard late variety.
Pride of the Market.....	Hend. & Co.	June 10	July 15	Aug. 10	24	4	7	8	4½	56¼	A very productive variety of good quality.
William I.....	Hend. & Co.	June 5	July 10	Aug. 15	24	2	5	14	3¼	43¾	A prolific small seeded variety.
Telegraph.....	Hend. & Co.	June 5	July 10	Aug. 1	30	3½	6	12	3	37½	Pods of large size, well filled, excellent flavor.
Perfection.....	Burpee.....	June 5	July 10	Aug. 5	18	2½	4	16	3	37½	A first class variety, medium prolific.
Yorkshire How.....	Hend. & Co.	June 5	July 15	Aug. 15	30	3	5	9	3½	43¾	A wrinkled variety of excellent quality.
Eugenie.....	Hend. & Co.	June 24	July 15	Aug. 5	24	3½	5	24	7	87½	An immensely productive variety of excellent quality.
G. F. Wilson	Hend. & Co	June 15	July 10	Aug. 5	24	2¼	3	10	3	37½	Seeds large, pods fairly filled, quality medium.
Laxton's Charmer.....	Hend. & Co	June 15	July 10	July 24	48	2¼	6	14	5	62½	Pods well filled, seeds smooth, prolific.
Hend.'s Midsummer....	Hend. & Co.	June 10	July 10	July 28	24	3	5	12	3½	43¾	Seeds wrinkled, quality the best, medium prolific,

American Champion....	Hend. & Co.	June 10	July 5	July 28	36	3½	5	14	3½	43¾	Seeds wrinkled, pods poorly filled, quality good.
Caracticus.....	Hend. & Co.	June 4	June 23	July 10	24	2	6	15	3¾	49¾	A smooth seeded early variety, prolific.
Kentish Invicta.....	Hend. & Co.	June 10	June 30	July 24	18	2¼	5	10	3½	43¾	Seeds green, medium size, medium prolific.
Saxton's Marvel	Hend. & Co.	June 15	July 12	July 28	24	2¼	7	14	4¾	46½	Pods well filled, seeds pale green, quality medium.
Premium Gem.....	Hend. & Co.	June 8	June 26	July 15	10	2½	8	8	3	37½	Pods well filled, seeds large, wrinkled, pale green.
Tom Thumb.....	Hend. & Co.	June 10	June 30	Aug. 20	8	2¼	5	8	3¼	40½	Seeds large, wrinkled, of good quality, early.
Blue Peter.....	Hend. & Co.	June 10	June 30	Aug. 20	12	2	5	10	3½	43	Seeds smooth, early, prolific.
Little Gem.	Hend. & Co.	June 10	June 30	Aug. 20	12	2	4	8	3	37½	Pods small, seeds large and wrinkled, pale green
American Wonder.....	Hend. & Co.	June 10	June 30	Aug. 20	6	2	5	8	3¼	40½	Pods well filled, seeds flat, blueish green, prolific.
Henderson's First of All	Hend. & Co.	June 4	June 20	July 10	18	3	6	14	4½	46	Pods slender, seeds small and smooth, early.
Saxton's Alpha.....	Hend. & Co.	June 4	June 26	Aug. 15	18	3	5	12	3¾	46¾	An early, wrinkled variety, very desirable.
Daniel O'Rourke..... ...	Hend. & Co.	June 4	June 18	July 10	36	3	7	14	4½	46	Pods well filled, seeds smooth.
Phila. Extra Early.....	Hend. & Co.	June 4	June 20	July 15	36	2	5	14	3½	43	A well-known smooth seeded variety
Hend. First and Best....	Hend. & Co.	June 4	June 18	July 15	18	2½	5	12	3	37½	Plant dwarf, pods slender, prolific, early variety.
John Bull..	Hend. & Co.	June 15	July 24	Aug. 15	24	4	6	14	4	50	Pods well filled, seeds wrinkled.
Fill Basket.....	Hend. & Co.	June 15	July 5	Aug. 1	24	3	7	12	3	37½	Pods well filled, seeds small, undesirable.
Advancer	Hend. & Co.	June 10	July 5	July 2	30	2½	5	12	3	37	Seeds wrinkled, excellent quality, medium prolific.
Stratagem.....	Hend. & Co.	June 15	July 10	Aug. 1	24	3	6	14	4½	46	Pods well filled, an admirable variety.
Minimum	Burpee	June 10	July 5	July 20	8	2	6	10	2¾	34⅓	Pods well filled, medium, prolific.
Burpee's Quality.....	Burpee	June 10	July 8	July 20	16	2½	5	9	3¼	40⅓	Pods well filled, seeds large, wrinkled, prolific.

CABBAGE.

Seeds of twenty-four varieties of the cabbage were sown in the hot bed April 12, and planted out of doors May 6. The plants were irrigated nine times during the season, cultivated six times and hoed twice.

The earliest to form heads were Landreth's Earliest, a cone-shaped variety, and Henderson's Selected Wakefield.

The latter's Early Summer and Succession following later. Succession is a grand cabbage. The trial packet of which proved to be better selected than that purchased from the same owners.

No. 37 of Henderson's is also a very fine cabbage, producing the largest heads of all the kinds grown. The Savoy varieties were the latest and least affected by insects. (Statistics are given in table.)

Twenty-three varieties of cabbage were also sown in cold frame on April 30 for lack of room in the hot bed. Early Summer sown in cold frame on this date produced heads fit for market in 116 days. The same variety sown in hot bed April 12 were fit for market in 115 days.

Early Jersey Wakefield sown in cold frame April 30 was marketable in 106 days. The same variety sown in hot bed April 12 was salable in 103 days.

Other varieties exhibit the same uniformity in reaching maturity when sown under opposite conditions and at different dates.

Of varieties in this table we were pleased with Excelsior Flat Dutch, All Seasons, Bloomsdale and Sure Head.

The following table details results :

CABBAGE. (Sown in Hot Beds.)

NAME.	Of whom purchased.	Fit for market	Average wgt. of 6 heads.	Estimated yield per acre—tons.	REMARKS.
Early Flat Dutch	Hend. & Co	July 28	4 5-6	16.15	Heads solid and compact, mixed with Wakefield.
Henderson's Early	Hend. & Co	Aug. 5	4	14.50	Heads roundish, solid, identical with Early Summer.
Landreths' Earliest	Land. & Son	July 24	3 5-6	13.91	Heads cone-shaped, solid, mixed somewhat.
Select Wakefield	Hend. & Co	July 28	4 5-6	17.54	Heads mostly conical, a fine strain.
Early Cone	Land. & Son	Aug. 1	3 2-5	13.30	Heads cone-shaped, resembling Winningstadt.
Landreths' Early Summer	Land. & Son	Aug. 1	3⅛	11.45	Heads roundish, flat, not solid, inferior
Curled Savoy	Land. & Son	Sept. 28	4⅛	15.12	Heads conical, fairly solid, good stock.
Drumhead Savoy	Hend. & Co	Sept. 28	3 5-6	13.91	Heads roundish, flat, fairly solid, good stock.
Netted Savoy	Hend. & Co	Sept 28	3 2-5	13.31	Heads roundish, flat, desirable.
Reynold's Early	Hend. & Co	Aug. 10	4 2-5	16.94	Heads roundish, solid, fairly uniform.
Silver Leaf Drumhead	Hend. & Co	Sept. 20	7	25.41	Heads large, flat, solid, leaves silvery green, true.
Hard Heading	Gregory	Sept. 20	6 1-3	22.99	Heads round, solid, uniform.
Sure Head	Maule	Sept. 28	5	18.15	Heads roundish, fairly solid, roundish.
No. 37 (trial packet)	Hend. & Co.	Sept. 20	8 5-6	32.07	Heads roundish, flat, very solid, admirable stock.
Premium Flat Dutch	Hend. & Co	Sept. 20	6⅛	22.39	Heads solid, uniform, well selected.
Large Bergen Drumhead	Hend. & Co	Sept. 20	6⅛	22.29	Heads roundish, flat, solid and uniform.

Henderson's Succession	Hend. & Co.	Aug. 1	7	25.41	Heads flat, solid, uniform.
Mammoth Red	Hend. & Co	Sept. 28	7 5-6	28.43	Heads roundish, purple red, solid and uniform.
Late Flat Dutch	Hend. & Co	Sept. 28	6⅔	24.20	Heads solid and very uniform.
Large Late Mountain	Land. & Son	Sept. 28	5 5-6	21.13	Heads roundish, flat, loose, very inferior stock.
Jersey Wakefield	Hend. & Co	July 24	4½	16.34	Heads generally conical, very solid, desirable.
Stone Mason	Hend. & Co	Sept. 20	6⅛	22.34	Heads round, flat, very solid and uniform.
Early Summer	Hend. & Co	Aug. 5	5 5-6	21.18	Heads flat, very solid and uniform.
Early Pointed Market	Dept of Agr.	Aug. 14	3⅛	11.29	Heads conical, very early, resembles Early York.
Early Summer	Dept. of Agr.	Aug. 24	3½	13.00	Heads roundish, flat, uniform, desirable, second early.
Burpee's Early Advance	Burpee & Co.	Aug. 24	3 1-3	12.40	Heads conical, loose, inferior stock.
Reedland Drumhead	Land. & Son.	Aug. 20	5 2-5	20.57	Heads roundish, flat, fairly solid, uniform.
Bloomsdale Drumhead	Land. & Son.	Aug. 26	4	14.02	Heads flat, fairly solid, uniform.
Select Jersey Wakefield	Land. & Son.	Aug. 14	4½	16.34	Heads conical and roundish, very solid and desirable.
Excelsior Flat Dutch	Dept. of Agr.	Sept. 28	7⅛	26.00	Heads solid, flat, very uniform.
Berkshire Beauty	Dept. of Agr.	Sept. 28	4⅔	16.94	Heads roundish, very solid and uniform.
Early Express	Burpee & Co.	Aug. 28	3½	13.00	Heads conical, very poor stock.
Early Etampes	Maule	Aug. 28	3	10.89	Heads conical, fairly solid, not uniform.
Southern Drumhead	Dep. of Agr.	Oct. 10	4½	16.34	Heads roundish, flat, too leafy.
Bloomsdale Flat Dutch	Land. & Son.	Oct. 10	4½	16.34	Heads small but very solid and well selected.
Maule's Flat Dutch	Maule	Oct. 10	5	18.15	Heads roundish, flat, fairly solid, too leafy.
Sure Head	Dep. of Agr.	Oct. 10	5½	19.96	Heads roundish, flat, very solid and desirable.
Maule's Drumhead	Maule	Oct. 10	5 5-6	21.17	Heads round, flat, fairly solid.

CABBAGE.—*Concluded.* (Sown in Hot Beds.)

NAME.	*Of whom purchased.*	*Fit for market*	*Average wgt. of 6 heads...*	*Estimated yield per acre —tons.....*	REMARKS.
Mammoth Bergen.....	Land. & Son`....	Oct. 10	2	7.76	Heads very soft and leafy, inferior stock.
Vandergaw.....	Burpee & Co	Oct. 10	5 1-3	19.36	Heads flat, of good size, but too loose.
All Seasons.....	Dep. of Agr.....	Aug. 28	6 1-6	22.38	Heads very solid, well selected.
New Express	Maule	Aug. 28	2 1-5	8.97	Identical with Ea. Express of Burpee, inferior stock.
Large Late Drumhead	Land & Son ...	Oct. 10	5½	20.57	Heads roundish, flat, very solid and desirable.
Maule's Wakefield.....	Maule	Aug. 20	3½	13.00	Heads cone-shaped, fairly solid.
Stone Mason.....	Dept. of Agr.....	Oct. 10	5 5-6	21.67	Heads roundish, flat, solid and desirable.
Buncomb.....	Land & Son..	Oct. 10	4[illegible]	16.34	Heads round and fairly solid.

CAULIFLOWER.

Seed of sixteen varieties of cauliflower was sown April 12 in hot bed and transplanted to the open ground May 7. They were irrigated at planting time, and on May 14 and 28, June 11, July 5 and 20, August 3 and 15 and on September 5.

The area in crop was one-third of an acre and the stand nearly perfect. The plants were hoed twice and cultivated six times. The soil, a clay loam, was lacking in fertility for the best culture of the cabbage and cauliflower.

Of the varieties grown, Henderson's Snowball was the best, with the latter's Early Erport a good second.

These two types when well selected are the only ones that can be relied upon to give profitable results in Colorado.

The plants from the commission seed of Ferry & Co. proved to be worthless.

Our notes are grouped in the following tables:

CAULIFLOWER.

NAME.	Of whom purchased.	Fit for market	Average wgt. of 6 heads.	REMARKS.
Early Snowball	Hend. & Co	July 20	7 5-6	Heads compact, very white, leaves small, very uniform.
Extra Ea. Erport	Hend. & Co	Aug. 6	5	Heads fairly solid and white, leaves large.
Extra Ea. Paris	Land. & Son	Aug. 24	5½	Heads solid and white, leaves very large.
Early Paris	Ferry & Co	.....	....	No heads formed.
Early Snowball	Land. & Son	Aug. 6	5 1-3	Heads compact, very white, plant dwarf, small leaves.
Gerry Island	Gregory	.....	....	No heads formed.
Select Dwarf Erport	Land. & Son	July 24	6 3-6	Heads large and compact, very white and uniform.
Burpee's Earliest	Burpee	July 30	5 1-6	Heads compact and white, leaves large.
Le Normand	Land. & Son	Sept. 20	5 1-6	Heads solid and white, plant vigorous and dwarf.
Long Island Beauty	Low	Aug. 24	5	Heads loose, yellowish white, inferior stock.
Algiers	Land. & Son.	Oct. 10	6½	Heads solid and large, plant vigorous, leaves very large.
Dalcheren	Land. & Son	.....	....	No heads formed.
Large Late Dutch	Land. & Son	Oct. 10	6 1-6	Heads fairly compact, plant vigorous and large.
Late London	Ferry & Co	.....	....	No heads formed.
Landreth's First	Land. & Son	Aug. 24	6	Heads solid, very white, of superior quality.
Vick's Ideal	Low	Aug. 6	5½	Heads solid, yellowish white, leaves large.

TOMATOES.

A comparative test of thirty-two varieties of the tomato for earliness was made the past season. Seed was sown March 31, and the plants set out in the field May 24. The area in crop was one-fourth of an acre. The plants were cultivated five times, and irrigated at time of planting and on May 28, June 11 and 26, July 5 and 20, August 3, 13 and 22.

Golden Queen ripened fruit first July 26, closely followed by Early Jersey, Dwarf, Champion, Livingston's Pefection, Mayflower and Yellow Plum.

There is some variation in the period of ripening of the same varieties from different sources, even when of equal size and vigor, the result of selection in growing for seed. So that duplicate tracts would exhibit some variation in the results.

The new tomato, Dwarf Champion, is an acquisition. Its habit is upright, bushy, robust and very distinct; fruit smooth, dull red, skin tough, a good shipper.

The varieties of this plant are now numerous, and it would seem to be impossible to improve the fruit beyond what has already been accomplished.

The habit of the tomato has, however, been amazingly altered for the better in the Dwarf Champion.

TOMATOES.

NAME.	Of Whom Purchased.	First Fruit Set on.....	Fruit Ripe on.	Length of vine Inches.....	REMARKS.
Queen	Hend. & Co	June 28	July 26	30	Fruit solid, smooth, roundish, color light red.
Fiji Island	Hend. & Co	July 15	Aug. 10	32	Fruit large and solid, color red, fairly smooth, late.
Perfection	Hend. & Co.	July 10	Aug. 5	24	Fruit solid, smooth, prolific, plants blighted.
Canada Victor	Hend. & Co.	July 10	Aug. ?	20	Fruit irregular, rough, early.
Island Beauty	Hend. & Co.	July 15	Aug. 10	30	Fruit rough, prolific, medium early.
Mikado	Hend. & Co	July 10	Aug. 2	36	Fruit irregular, very rough, early.
Green Gage	Hend. & Co.	July 10	Aug. 12	36	Fruit smooth, color greenish white.
Ivory Ball	Land. & Son	July 10	Aug. 12	40	Fruit small, smooth, solid, prolific.
Red Cherry	Hend. & Co.	July 15	Aug. 6	36	Fruit smooth, shape and size of cherry.
Fulton Market	Dept. of Agricultu	July 15	Aug. 10	30	Fruit smooth, large, solid, prolific.
Optimus	Hend. & Co.	July 16	Aug. 2	24	Fruit smooth, solid, color dark red, early.
Yellow Plum	Hend. & Co.	July 5	Aug. 10	48	Fruit smooth, yellow, ripens evenly, desirable.
Essex Round Smooth	Gregory.	July 15	Aug. 10	30	Fruit medium size, very smooth, prolific.
Mayflower	Hend. & Co.	July 5	July 30	30	Fruit smooth, solid, very early.
Essex Hybrid	Hend. & Co.	July 5	Aug. 3	30	Fruit similar to the Acme.
Golden Trophy	Hend. & Co.	July 10	Aug. 3	24	Fruit irregular, rough, prolific.

Dwarf Champion	Hend. & Co.	July 26	Aug. 3	20	Vines upright, fruit solid, round, purplish red, prolific.
Paragon	Hend. & Co.	July 15	Aug. 10	30	Fruit red, medium size, plants blighted badly.
Gen. Grant	Hend. & Co.	July 15	Aug. 3	36	Fruit large, good quality, ripens evenly and rapidly.
Livingstone's Favorite	Hend. & Co.	July 15	Aug. 3	30	Fruit large and smooth, dark red, prolific.
Conqueror	Hend. & Co.	July 15	Aug. 5	30	Fruit rough, early, prolific, blighted badly.
Hathaway	Hend. & Co.	July 10	Aug. 5	36	Fruit large and solid, of good flavor.
Cardinal	Hend. & Co.	July 15	Aug. 5	24	Fruit solid, smooth, red, ripens evenly, prolific.
Scoville's Hybrid	Hend. & Co.	July 15	Aug. 3	24	Fruit small and smooth, resembles Paragon.
Trophy (selected)	Hend. & Co.	July 15	Aug. 15	26	Fruit smooth, large, prolific, late.
Pear Shaped	Hend. & Co.	July 10	Aug. 1	36	Fruit dark red, quality excellent, very prolific.
Acme	Land. & Son	July 10	Aug. 10	30	Fruit large smooth, fairly solid, prolific.
Early Jersey	Land. & Son	July 5	Aug. 30	32	Fruit irregular, solid, good flavor.
Trophy	Hend. & Co.	July 15	Aug. 10	30	Fruit smooth or irregular, not well selected.
Dwarf Champion	Low	July 5	Aug. 30	30	Five days earlier than Henderson & Co.'s seed of this variety.
Perfection	Low	July 5	Aug. 30	30	Fruit smooth, fairly solid, early and prolific.
Ground Cherry	Low	July 5	Aug. 30	20	Vines upright, desirable for canning.

EGG PLANT.

We planted seed of four varieties of egg plant on March 31, setting the plants in the open ground May 25. The varieties planted were New York, Improved, Early Long Purple, Boyden's Wonder and Black Pekin. The earliest of these was the Black Pekin which had fruit fit for use August 15; New York Improved and Early Long Purple next, five days later. Boyden's Wonder bears very large, dark, purple, strongly-ribbed fruit, which were fit for table use August 25.

PEPPERS.

Seed of twelve varieties of peppers was sown in hot bed March 31, and planted in the open air May 28. It would be better to sow earlier than this by two weeks, and to plat only the richest land to induce a quick growth and early maturity of fruit. Of the varieties grown the most desirable for this region are Golden Bell, Bull Nose, Ox Heart, Ruby King and Propoff's Giant. The latter being the latest to ripen of these kinds.

In the following table our notes are grouped on these varieties.

PEPPERS.

NAME.	*Of whom Purchased.*	*Date of first bloom.*	*Set fruit on.*	*Fit for market.*	*Fruit ripens on*	REMARKS.
Cherry Red	Land. & Son	July 20	July 28	Aug. 15	Sept. 15	Very prolific and ornamental.
Ruby King	Hend. & Co.	July 28	Aug. 6	Aug. 20	Sept. 20	A desirable variety for this region.
Golden Bell	Land. & Son	July 12	July 20	Aug. 14	Sept. 15	Fruit 6 inches long, early and desirable.
Ox Heart	Hend. & Co.	July 12	July 20	Aug. 14	Sept. 15	Fruit small, dark red color, early, prolific, desirable.
Red Cluster	Burpee	Aug. 23	July 28	.....	.....	No fruit ripened.
Propoff's Giant	Burpee	July 12	July 26	Aug. 10	Sept. 30	Fruit 8 inches long, dark red, very late to color.
Bull Nose	Hend. & Co.	July 10	July 20	Aug. 10	Sept. 25	Fruit large and mild, very desirable here.
Tomato	Hend. & Co	July 15	July 26	Aug. 14	Sept. 25	Fruit small or medium size, not prolific.
Long Red Cayenne	Hend. & Co	July 15	July 26	Aug. 14	Sept. 25	Pods conical, bright scarlet when ripe.
Smooth Red Chili	Hend. & Co	July 15	July 26	Aug. 14	Sept. 25	Undesirable here.
Mammoth	Hend. & Co.	July 26	Aug. 20	.....	.....	No fruit ripened.
Child's Celestial	Land. & Son	.....	.....	.....	.....	No fruit ripened—worthless.

BEANS.

We planted thirty-five varieties of beans May 10, on a quarter of an acre of ground, for the purpose of making a comparative test of earliness and availability for this region. The earliest of the bush varieties were Red Valentine and Long Yellow, six weeks, both fit for table use in fifty-five days.

Of the wax varieties the earliest was the Black-eyed Wax, which was marketable in fifty-eight days.

The earliest pole variety was the Case Knife, marketable in seventy-seven days, followed by Horticultural, German, Wax and Dreer's Improved Lima.

The small Lima, or Sieva, is of no value here.

Broad Windsor, the well-known broad bean of England, is well adapted to this climate, being vigorous, healthy and productive.

Our notes are grouped in the annexed table.

Varieties marked with an asterisk (*) are pole beans.

BEANS.

NAME.	*Commenced flowering*	*Through blooming*	*Fit for table use*	*Pods ripe*	REMARKS.
Early Feejee	June 12	July 30	July 12	Aug. 6	A productive variety inclined to run, pods grayish green.
French Etampes	June 12	July 30	July 7	Aug. 6	Early and of good flavor, must be used young, pods dark green.
Green Flageolet	June 12	Aug. 6	July 20	Aug. 20	A good string or shell bean variety, seeds greenish white.
Canadian Wonder	June 12	Aug. 6	July 20	Aug. 20	Pods large, of good quality, plant compact, dwarf.
Large White Kidney	June 12	July 30	July 14	Aug. 6	A shell variety, edible, pods green, seeds large, plant dwarf.
Long Yellow, six weeks	June 12	July 24	July 4	Aug. 6	Plant vigorous, dwarf, edible, pods grayish green.
Early Mohawk	June 12	July 30	July 7	Aug. 6	Plant dwarf, very early, pods green, six inches long.
Rhode Island	June 12	July 30	July 7	Aug. 6	Plant dwarf, vigorous, prolific, quite early.
Broad Windsor	.....	.....	.....	.....	Stalks vigorous, erect, 2½ feet high, productive and valuable here.
Dwarf Horticultural	June 12	July 24	July 7	Aug. 6	A bush form of the Horticultural.
Early China	June 12	July 30	July 14	Aug. 6	Vigorous dwarf, early variety, seeds white, with a large spot at the eye.
Hend. Red Valentine	June 5	July 24	July 4	Aug. 6	Identical with Red Valentine, but earlier.
Emperor William	June 12	July 24	July 7	Aug. 6	Early, vigorous, dwarf, pods large, flat, seeds white.
White Valentine	June 20	Aug. 6	July 14	Aug. 20	A prolific, early variety, pods green, seeds small, color white.
Refugee	July 26	Aug. 20	July 28	Sept. 10	A prolific late bush variety, pods green and purple, seeds brown and reddish purple.
Low's Champion	June 12	July 30	July 14	Aug. 6	Pods whitish, tender, of good quality, a good shell or snap bean.

BEANS.—*Concluded.*

NAME.	*Commenced flowering*	*Through blooming*	*Fit for table use*	*Pods ripe*	REMARKS.
Wonder of France	June 12	July 30	July 14	Aug. 6	Pods long and straight, a dwarf, early variety.
Gallega	June 12	July 30	July 14	Aug. 6	Almost identical with Refugee, but earlier.
Early Red Valentine	June 12	July 30	July 14	Aug. 6	Pods round, seeds speckled, one of the best snap varieties.
Black Eyed Wax	June 12	July 30	July 7	Aug. 6	Early, productive, vigorous, good flavor.
Ivory Pod Wax	June 20	Aug. 6	July 14	Aug. 20	A vigorous, spreading grower, pods long, waxy white, seeds white.
Date Wax	June 12	July 30	July 14	Aug. 6	Plant robust and productive, pods fair size, flat, color golden-yellow.
Dwarf White Wax	June 12	July 30	July 14	Aug. 6	Vigorous, strictly dwarf, seed small, color white.
Dwarf Mont. D Or	June 12	July 30	July 14	Aug. 6	Plant vigorous, dwarf, productive, pods yellow.
Flageolet Wax	June 7	July 30	July 16	Aug. 6	Pods large, tender, productive.
Crystal White Wax	June 7	July 30	July 16	Aug. 6	A vigorous bush variety, pods pearl green, seeds small, white.
Early Golden Cluster	July 26	Sept. 5	Aug. 15	Sept. 15	Vines vigorous, healthy, pods large, golden yellow, productive.
Small Lima	July 26	.....	.....	.....	This variety ripened no seeds.
Dreer's Improved Lima	July 7	Aug. 24	Aug. 10	Sept. 10	A desirable variety of the Lima, early and productive.
White Dutch Runner	July 25	Aug. 6	Aug. 20	Sept. 15	An ornamental variety, bearing white flowers and seeds.
Horticultural Pole	July 6	Aug. 24	Aug. 6	Sept. 20	Vigorous and moderately productive, desirable for snaps or dry beans.
Dutch Case Knife	July 7	Aug. 20	July 26	Aug. 20	A desirable, very early variety.

Scarlet Runner	July 7	Aug. 24	Aug. 10	Sept. 10	Highly ornamental, used both as a string bean and shelled.
Large White Lima	July 26	Sept. 10	Aug. 25	Sept. 20	A standard sort, late to ripen.
Southern Prolific	June 30	Aug. 20	July 26	Sept. 10	Early, and productive until frost.
German Wax Pole	June 20	July 26	July 7	Sept. 10	A good snap variety, pods yellow, seeds large, color black.

MELONS, MUSK.

Seeds of eighteen varieties of melon were planted June 16 for a comparative test of earliness.

The plants were irrigated three times, cultivated three times and hoed twice.

The Large Yellow ripened fruit in sixty days from planting.

The varieties Jenny Lind, Ward's Nectar, Emerald Gem and Netted Gem in seventy days.

The variety latest to ripen fruit, was California Nectar, requiring 106 days.

Our notes are grouped in the following table :

MELON—MUSK.

NAME.	*Of whom purchased*	*Fruit forming*	*First ripe*	*Average weight of 6 fruits—pounds*	REMARKS.
Large Yellow	Hend. & Co	July 12	Aug 15	5½	Fruit ovate, skin yellow, flesh light orange, very sweet.
Ward's Nectar	Hend. & Co	July 24	Aug. 25	1 5-6	Fruit globular, slightly netted, flesh green, of fine quality.
Improved Christiana	Hend. & Co	July 24	Sept. 20	3½	Fruit ovate, ribbed, skin yellow, flesh orange, quality medium.
Netted Gem	Hend. & Co	July 16	Aug. 25	5-6	Fruit globular, small, skin light yellow, flesh light green, of fine flavor.
Bay View	Hend. & Co	July 30	Sept. 20	3 5-6	Fruit oblong, pointed, ribbed, flesh yellowish green, fine flavor, a good keeper.
Emerald Gem	Hend. & Co	July 26	Aug. 25	2	Fruit roundish, smooth, skin greenish yellow, flesh orange color, very thick, quality extra.
Nutmeg	Hend & Co	Aug. 2	Sept. 20	1½	Fruit roundish, ribbed, skin green, netted, flesh greenish yellow, good flavor.
White Japan	Hend. & Co	July 30	Sept. 15	2¼	Fruit ovate, skin whitish yellow, flesh rich orange color, fine flavor.
New England Hackensack	Hend. & Co	July 30	Sept. 15	2⅛	Fruit round, flattened at the ends skin green netted, flesh pale green of good flavor.
Skillman's Netted	Hend. & Co	July 24	Sept. 20	1 5-6	Fruit oval skin yellow, flesh light green, of excellent quality.
Baltimore Musk	Hend. & Co	July 30	Sept. 28	3	Fruit oblong, skin greenish yellow, flesh pale green, quality medium.
Green Citron Musk	Hend & Co	July 30	Sept. 15	2¼	Fruit round, netted skin, green yellow stripes, flesh yellowish green, quality good.
Montreal Market	Hend. & Co	July 20	Sept. 28	4	Fruit round, flattened at both ends, skin green, netted, flesh green and of fine flavor.
Surprise	Hend. & Co	July 26	Sept. 25	2⅛	Fruit roundish ribbed, skin cream color, flesh deep orange of excellent flavor.
La. Yellow Cantaloupe	Hend. & Co	July 20	Sept. 30	4½	Fruit roundish ribbed, skin green, flesh orange yellow; good.

MELONS—MUSK—*Concluded.*

NAME.	*Of whom purchased.*	*Fruit forming.*	*First ripe.....*	*Average weight of 6 fruits—pounds.....*	REMARKS.
California Nectar	Hend. & Co.....	July 26	Sept. 30	3½	Fruit roundish, skin netted, color green with yellow stripes, flesh yellowish to deep green, quality extra.
Jenny Lind.....	Hend. & Co.....	July 24	Aug. 25	¼	Fruit roundish, skin green netted, flesh green of good flavor.
Hackensack.....	Hend. & Co.....	July 24	Sept. 20	4	Fruit roundish, flattened at the ends, skin yellowish green, very thick, flesh green of best quality.

Report of the Chemist.

To the Executive Committee, State Board of Agriculture:

SIRS:—I have the privilege to report to you the work performed by the Chemical Section for the Experiment Station.

We have analyzed: Artesian water from Alamosa, Colorado, and from the Cache la Poudre river and Clear Creek; cheese, insecticides, and apples when blossoms had been sprayed with arsenites; sorghums and sugar beets, for per cent. of sugar contained; Alfalfa and bran, for nutrient substance in them; also, potatoes for per cent. of starch.

The total number of analyses to date is 227.

Respectfully submitted,

DAVID O'BRINE,

Chemist.

CORN.

We planted eighteen varieties of sweet corn on May 14, in wide apart situations to keep the kinds pure for seed. The earliest was the Cory, next Marblehead, then Crosby, Tom Thumb, Triumph and Early Minnesota. The late kinds were Stowell, Black Mexican and Hikok's Improved. Amber Cream and Golden Sugar did not ripen. Perry's Hybrid is a variety of great vigor, attaining a hight of six feet, ears fit for use in eighty-eight days from planting.

SUGAR BEETS.

Four varieties of sugar beet were received from the Department of Agriculture, Washington, D. C., last spring and were sown April 15 on a fourth of an acre of ground. The plat was irrigated four times, cultivated six times and hoed twice. The varieties are as follows:

Lane's Imperial, roots very smooth, skin white, reddish tint, growing under ground. Estimated yield per acre, 30.45 tons.

Excelsior Sugar, roots smooth, skin dull white, growing under ground. Estimated yield per acre, 29.4 tons.

Vilmorin Sugar, roots smooth, skin white with a purplish tinge, somewhat wrinkled, growing under ground. Estimated yield per acre, 25.9 tons.

Improved Imperial Sugar, roots rough, skin dull yellow, growing one half above the surface of the soil. Estimated yield per acre, 24.15 tons. This variety would have yielded the heaviest, if the stand had been perfect.

The estimate of yield are in all cases based on the yield of an average row of each kind. The soil on which these varieties were grown is a clay loam, which had been in clover sod for three years previous, and was plowed under in the fall of 1887. The yield of sugar beets in France, under average conditions, is sixteen tons to the acre, containing sugar to the amount of twelve or thirteen per cent.

CUCUMBERS.

NAME.	*Of Whom Purchased.*	*First Fruit Set on.*	*Fit for table use.*	*Fruit Ripe on.*	REMARKS.
Westerfield Chicago Pickle	Hend. & Co.	July 18	July 24	Aug. 6	Fruit 6 iuches long by 2½ in diameter; very productive.
Extra Long White Spine	Hend. & Co.	July 26	Aug. 2	Aug. 14	Fruit 6 to 8 inches long, color deep green.
Nichols Medium	Gregory.	July 3	July 10	July 24	Fruit medium size, smooth, a valuable variety.
Early Frame	Hend. & Co.	July 3	July 10	July 24	Fruit small, rather smooth, early and prolific.
Short Green Gherkin	Hend. & Co.	July 18	July 24	Aug. 2	Fruit small, identical with early frame.
Long Green Turkey	Hend. & Co.	July 20	July 30	Aug. 10	Fruit 12 inches long, pointed at both ends, color dark green.
Boston Pickling	Hend. & Co.	July 18	July 24	Aug. 10	Fruit of medium length, valuable for pickling.
Early Russian	Hend. & Co	July 3	July 10	July 24	Fruit small, fine for pickles, hardy and productive.
Green Prolific	Hend. & Co.	July 10	July 24	Aug. 2	This variety resembles Boston Pickling.
Early Cluster	Hend. & Co.	July 20	July 28	Aug. 18	A small prickly pointed variety of little value.
Extra Early Green Prolific	Hend. & Co.	July 10	July 20	July 28	Identical with Green Prolific.
Long Green	Hend. & Co	July 26	Aug. 2	Aug. 14	A large fruited variety, hardy and productive.
West Indian Gherkin	Hend. & Co.	.....	.....	.....	This variety set no fruit.

CUCUMBERS.

Seed of thirteen so-called varieties of the cucumber were planted June 16 to determine which were the earliest and most desirable for this region.

The plants were irrigated three times, cultivated three times and hoed twice.

The varieties that pleased us best were Nicholl's Medium, Early Frame and White Spine.

We noted the following data:

CARROTS.

NAME.	Weight of six roots, lbs.	Fit for table use.	REMARKS.
Half Long Danvers	8	July 6	Roots 3 inches in diameter, 8 inches long, color yellowish red and very smooth.
Long Orange Improved	5	July 6	Roots 12 inches long, color deep orange, very smooth.
Chantenay	4½	July 10	Roots 6 inches long, color scarlet, growing one or two inches above the soil.
Yellow Belgian	5¾	.....	Roots a foot long, color pale yellow, a field variety.
Mitchell's Perfected	5½	July 10	Roots 10 inches long, color scarlet, growing two inches above the soil.
Early Scarlet Horn	4½	July 8	Roots five or six inches long, skin smooth, color scarlet.
Carentan	....	July 18	Roots cylindrical, 6 inches long, bright red, shape and quality good.
Altringham	5	July 20	Roots 14 inches long, color orange red, very rough, growing 2 inches above the soil.
Half Long Scarlet	4¾	July 15	Roots 8 inches long, smooth, color scarlet.
White Belgian	6¾	.....	Roots 10 inches long, smooth, yellowish white, growing 3 inches above the soil.
Ox Heart	7¼	July 15	Roots short, color pale red, growing 2 inches above the soil.
Half Long Stump	3	July 20	Roots 6 inches long, color scarlet, very smooth and desirable.
Intermediate	4	July 20	Roots 12 inches long, very smooth, color orange red.
Early French Forcing	....	.....	The seed of this variety failed to germinate.

CARROTS.

Fourteen varieties of the carrot, covering one-fourth of an acre of ground, were sown April 15. The stand was very imperfect owing to lack of rains to germinate the seed, and the presence of the garden web worm early in the year. The plants were irrigated three times, cultivated five times and hoed once.

Like other root crops the carrot delights in a loose, richly-tilled soil, but is very impatient of much irrigation. The most desirable of the varieties grown were Danvers and Ox Heart. They are very easy to harvest and yield maximum crops.

Our notes are grouped in the accompanying table:

REPORT OF THE

Meteorologist and Irrigation Engineer.

To the Executive Committee in Charge:

GENTLEMEN:—I have the honor to submit the following report of my work in connection with the Experiment Station Department for 1888.

My connection with this Department began September 1, after most of the Irrigation season had passed; therefore, my report deals entirely with the metrological part of this Section.

Considerable work has been done in testing and comparing instruments, preparatory for next year's work, and to determine the errors of the instruments that have been used during the past year, in order that the observations may all be expressed in a uniform standard. The current work of keeping the records up to date has taken considerable time. The observations, themselves, have been taken by Mr. Kelly, our faithful janitor, and, since early in September, by Mr. A. L. Davis of the Senior class. Monthly reports of the data useful to the Signal Service have been forwarded to Washington, and monthly, and sometimes weekly, reports have been furnished the State weather service. Weekly summaries have also been furnished our local papers. All the time available has been given to a comparison of the previous records, a verification of their reduction, and an endeavor to put them in such form that their data may be available at any time.

The records of observations on file give, as a whole, several years data regarding the climate of this part of the country.

In March, 1872, Mr. R. Q. Tenny began regular tri-daily observations of the thermometer, and adding a rain gauge to his equipment in 1873, carried on the observations until January, 1875. These records were turned over to the College, and through the care and at the personal expense of Prof. C. F. Davis were copied in a permanent form.

Shortly after the opening of the College, Hon. F. J. Annis, then Professor of Chemistry, began observations of temperature, movements of the wind, and maximum and minimum temperature; and these, together with atmospheric pressure, afterward added, were carried on by him until he entered upon the practice of his profession. After this date observations were carried on by Professor Davis and Professor Blount. The records are somewhat incomplete. Much credit is due to these professors, pressed as they were with a multiplicity of duties, for having begun and carried on observations under such difficulties.

In October, 1886, the work was put in the able hands of Professor Mead, and since January 1, of the following year, the records are almost entirely complete. The lack of record, when any, is due to some accident to the instruments. Professsor Mead, having resigned in March, 1888, the observations were faithfully carried on under the direction of Professor Stolbrand until September 1, when the Department was turned over to my charge. I had hoped to insert in this report complete summary of these observations, but this work, which involves a critical inspection of all the records, a verification of all the reductions and summations, requires more time than other duties have left free, and the summaries can be only partially given at this present date.

In the list of observations I ought not to omit mention of soil temperatures carried on by Professor Davis during one summer. Temperatures of soil at the surface, six inches below and of the air were taken three times a day; these were charted and the chart is on file. The apparatus was somewhat imperfect but the observations are valuable, and in some respects carry our soil temperature's records back one year.

Appended to this report is a description of apparatus used at this Station, and summary of rainfall and highest and lowest thermometer for certain periods.

Respectfully submitted,

LOUIS G. CARPENTER,

Meteorologist and Irrigation Engineer.

DESCRIPTION OF THE INSTRUMENT.

Draper's Self Recording Thermometer is represented in Fig. 1. The parts visible are only the record dial and the lever carrying the pen. The dial is moved by clock work, and revolves once per week. As the temperature increases or decreases the pen moves from or to the center, leaving a continuous ink line, which gives a permanent record of the temperature.

Fig. 2 represents the working parts as they appear when the dial is removed. The clock work is enclosed in the circle C A W. A is the arbor fitting the hub, shown in Fig. 1, and causing the dial to make one revolution per week. The pen D is at the end of the lever L, which is moved by the thermometer strips N N. These strips are compound bars, made of a strip of steel fastened to a strip of brass. Brass has the property of ex-

panding more than steel of a given increase in temperature, and this property is made use of in the construction of the instrument. The upper strip has the brass

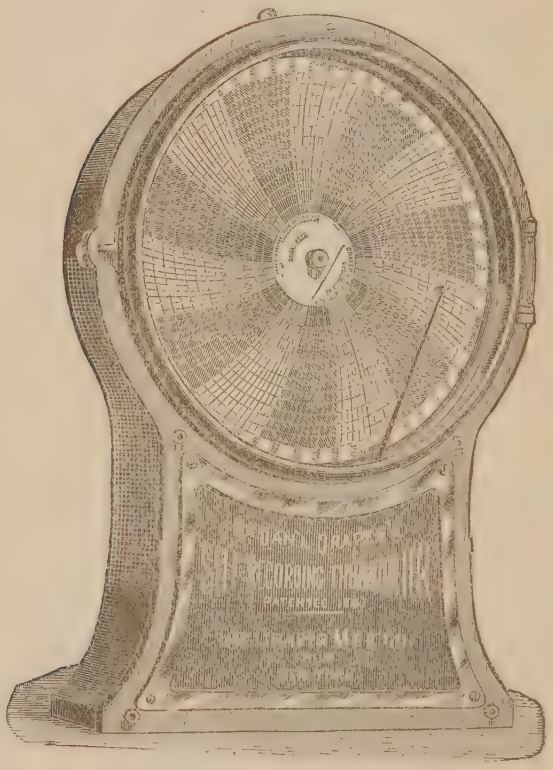

FIG. 1.

side away from the clock and as the temperature rises the bar will curve toward F allowing the lever L to move to the right. The lower strip N has the brass strip on the side toward the clock, and as the temperature increases the strip will bend to the left, pulling lower F with it, thus causing the pen to move to the right. The two strips together allow of no lost motion.

The set screws S S permit the instrument to be adjusted to read with an ordinary thermometer.

The instrument gives very satisfactory results, as a

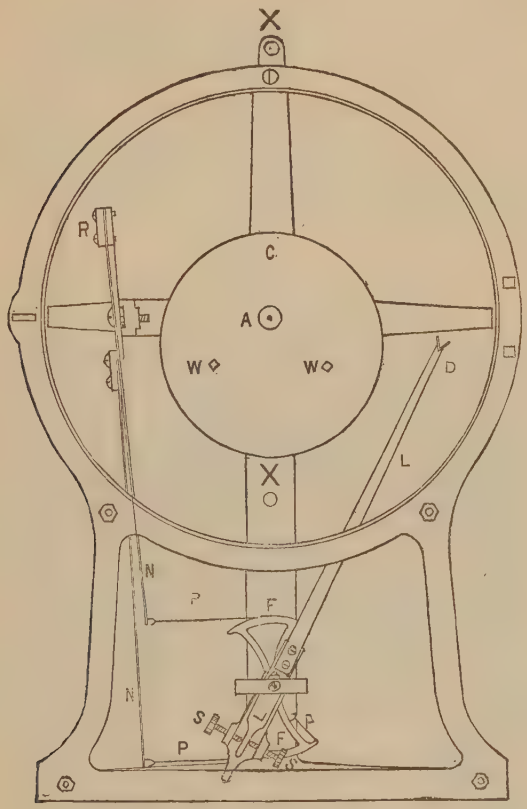

FIG. 2.

rule, and agrees quite closely with the mercurial thermometer. The greatest trouble has been with the tendency of the clock work to stop during cold weather. A new movement has been put in this fall which is giving more satisfactory results.

This instrument was put up in June 1887, since which time we have almost continuous records from it.

The Recording Sun Thermometer, also invented by Dr. Draper, is shown in Fig. 3. The thermometer strip is like that in the previous instrument, a compound

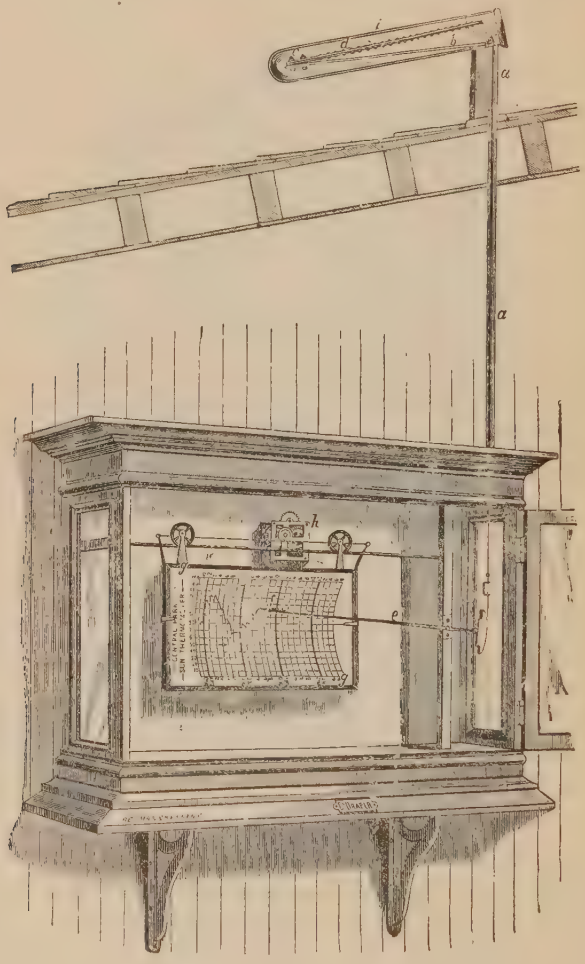

FIG. 3.

bar of steel and brass, and is situated on the roof, covered with a glass shade. A wire leads from the free end of this strip down the tube *a* to the lever *g*, carrying a

pen which it moves up or down according to the intensity of the sunshine. The paper on which the record is traced is moved forward by the clockwork, so that the record of a week is included on one sheet.

The instrument is sensitive to the slightest change in the sun's radiation. A cloud passing before the sun is shown by the instrument by a lowering of the pen; and a day of clouds, intermingled with sunshine, is recorded by an irregular, jagged line, such as that shown in the cut. On a day of pure sunshine the record is an

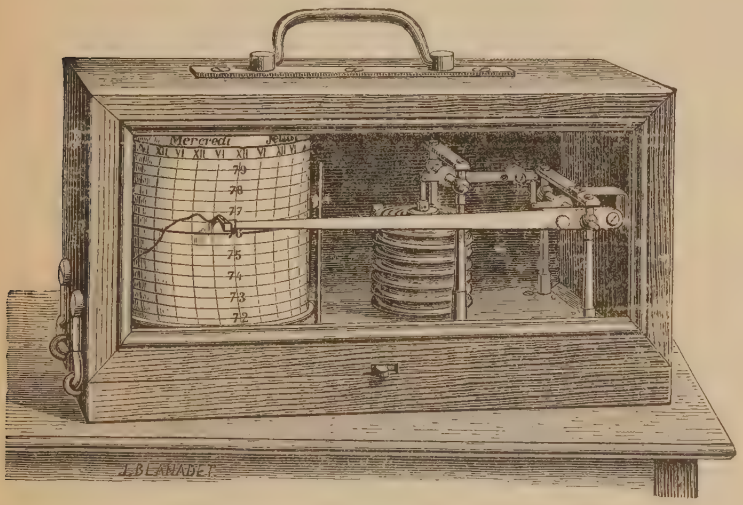

FIG. 4

even, uniform curve, rising from early in the morning until its maximum, about noon, and then descending until night.

As an illustration of its sensitiveness I may mention that on taking charge of this department, and looking over the records, it seemed curious that there should have been a cloud passing over the sun nearly every day as the record seemed to show. After further comparison this fall it was found that the same depression oc-

curred on days absolutely free from cloud. Further search disclosed the source of the trouble in the wind vane, which, being to the south of the instrument, with some direction of the wind, cast its shadow across the thermometer strip. The wind vane, which was to the south, cast its shadow, as it veered, on the thermometer of the instrument, giving the same record as a cloud.

We have records from this instrument from June 4, 1888.

The Barometer, which has been read since the first of September, is Green's Standard Mercurial Barometer, No. 2976. Barometer No. 2982, of the same maker, intended for the San Luis station, was found, on comparison, to differ slightly from the other, and a series of observations have been made to determine the correction that the instruments may read the same.

Until September readings had been made from a self-recording aneroid barometer, shown in Fig. 4. The disks in the center of the cut have the air exhausted from them and consequently, if the pressure of the air increases, these are pressed together and this motion, multiplied by the series of levers, causes the pen at the end of the long lever to rise. The levers are so adjusted in length that for a change of an inch in a mercurial barometer the pen will change by one inch. The cylinder on which the pen marks is revolved by internal clock work once a week.

A careful comparison of its indications with the readings of the mercurial barometer is being made to determine the amount of correction necessary to make to the previous readings of the year. It is designed to carry on the comparison for three months. The comparison to date is more favorable to the aneroid than I anticipated. Its variation from the mercurial shows very little fluctuation that is not due to the errors of reading.

A continuous record of this instrument from September, 1887, is on file.

The Anemometer or wind register has the balls which rotate with the wind, on the roof of the dormitory. This is so adjusted that at the end of a given number of revolutions, which correspond to a mile of wind, an electric circuit is closed, and a pencil in a room below marks on a cylinder revolved by clock work. At the end of the day the number of these marks indicate the number of miles of wind that has passed.

The moisture present in the air is determined by means of the ordinary wet and dry bulb thermometers, and the amount of rainfall by rain gauges of the pattern adopted by the signal service.

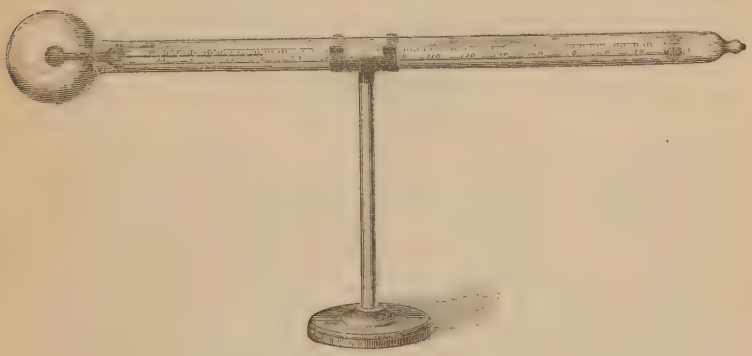

FIG. 5.

The Evaporation Tank is of galvanized iron, three feet square and three feet deep, sunk even with the surface of the ground. Observations have been taken by means of the hook gauge.

RADIATIONS.

Fig. 5 represents the instrument used for determining the intensity of the sun's radiation. It consists of a thermometer with blackened bulb placed in a glass

enclosure, from which the air has been exhausted. The excess of this reading over the highest temperature gives an approximate measure of the intensity of the sun's radiation. This assumes that the highest temperature of the air occurs at the same time as the highest reading of this thermometer, which is rarely the case, and therefore the results will generally be too small, never too

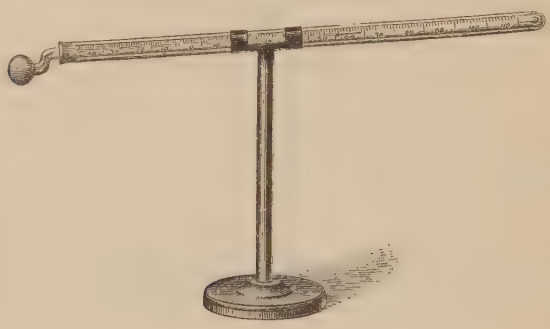

FIG. 6.

great. This instrument, in our intense sunlight and rare atmosphere, will give results of much interest. Its readings are 60° higher than the highest temperatures of the air on the average.

The Terrestrial Radiation instrument is shown in Fig. 6. It is dismounted from its stand and suspended a few inches above a grass plat. It registers the lowest temperature at that point, due to radiation, in the night. On clear nights this descends from 9 to 15 degrees lower than the temperature of the air a few feet above, and this shows how it is that there may be frost when the thermometer does not not reach 32°.

SOIL THERMOMETERS.

The form of the thermometers used in taking the temperature of the soil at different depths is shown in Fig. 7. It consists of a thermometer protected by a

wooden casing, with its bulb at a greater or less depth, as the case may be, while the scale, graduated to half degrees, is above ground. Thermometers with bulbs 6, 12, 24 and 36 inches below the surface were placed by Prof. Stolbrand June 8. A 3 inch and a 7½ inch were added September 15, and these form our standard set. We have duplicates of these for use next year in a comparison of the temperatures of irrigated and unirrigated soils.

FIG. 7.

This fall the thermometers are being tested side by side to determine the variation under the same conditions, preliminary to placing them under different conditions. Their record will be of great interest in connection with the study of the growth of plants.

SUNSHINE.

The amount of sunshine is recorded by an instrument of the Pickering pattern, which is on loan at the college.

An instrument shelter from the specifications of the signal service was constructed under the direction of Prof. Stolbrand, and furnishes the almost necessary conditions for correct exposure.

The foregoing list of instruments furnishes the present college equipment for observations in meteorologo and serves to show something of the labor involved in careful readings, reductions, comparative study of records and summarizing and interpreting results and their climatic bearings, all of which are of prime importance in future accurate work.

RAINFALL.

YEAR.	January	February	March	April	May	June	July	August	September	October	November	December	Total for Year
1873	.25	.16	*0	1.20	2.30	1.50	1.30	.85	.75	.42	.20	.17	9.10
1874	.06	.43	1.20	.77	2.95	.65	3.15	.25	*0	1.00	.02	0	10 48
1879	—	—	—	—	—	—	—	—	—	1.75	.15	.60	....
1880	1.27	.40	.38	.94	.60	.86	1.80	.37	1.47	2.07	—	.10	....
1881	1.10	.55	1.45	—	—	—	—	—	—	—	—	—	....
1882	.....	.....	.17	—	4.67	3.07	1.76	0.89	2.51	.82	.29	.....	....
1883	1 00	1.50	0.68	—	—	3.18	—	1.78	1.00	1 29	T	1.33	....
1884	1.10	.70	1.15	3.94	4.84	—	—	—	—	.10	1.80	.35	....
1885	1.77	—	—	—	—	—	—	—	—	—.	—	—	....
1887	.86	.23	.45	1.10	1.23	1.96	3.05	2.12	.54	.43	.15	0	12.12
1888	.29	.36	.73	1.23	3.39	.47	.60	1.01	.29	.88	.38	.16	9.79
Average	.86	.54	.69	1.53	2.85	1.67	1.94	1.04	.94	.99	.39	.34	13.78

* Record says showers.
T trace.

EVAPORATION FROM WATER SURFACE.

The evaporation from water was commenced by Prof. Mead in the spring of 1887. A galvanized iron tank three feet square and three feet deep was sunk flush with the ground. The amount of water in the tank is measured accurately by a special instrument, the Hook gauge. The fall in the surface of the water, increased by the amount of rain falling in the tank in the interval between the observations, gives the evaporation in that time. The quantity of rain is determined by the rain gauge placed within a few feet of the tank.

The evaporation for 1887 is also given for comparison. There being some doubt as to the interpretation of certain portions of the winter record, the winter months are not inserted.

The evaporation of June and July, it will be noticed, is very great—an average for those two months of nearly one-quarter an inch per day.

It should be stated that while the total amount of evaporation, 14.70 inches for those two months in 1888, is correct, as no observation was made from June 15 to August 1, the proportion evaporated in each of those two months is estimated from last year's observations. The same is true of August and September. Early in November the tank froze, and the ice remained undisturbed until January 1, when it was melted and the water measured.

Month.	1887.		1888.	
	Total for Month, Inches.	*Rate per day.*	*Total for Month*	*Rate per day.*
March	4.65	.15	.....	.....
April	5.55	.185	.....	.....
May	5.19	.167	4.45	.143
June	5.75	.193	7.70	.257
July	5.23	.17	7.00	.226
August	4.24	.137	4.65	.15
September	4.12	.137	3.35	.11
October	3.26	.105	2.17	.07
November	.....	.....	1.35	.045
December	.....	.....	.99	.032

NOTES TO THE TABLES.

The maximum and minimum temperatures have been read from the Draper Self-Recording Thermometer.

The column of Solar Radiation gives the difference between the maximum temperature of the air and the

highest temperature indicated by the special solar radiation instrument placed in full sunshine. The reading of the latter instrument on any date may then obviously be found by adding the numbers in the solar radiation and the maximum temperature columns. In a few cases, as June 12 to 18 and November 8 to 17, when the maximum temperature record is lacking or imperfect the actual readings are given.

The column of Terrestrial Radiation gives the number of degrees that that instrument falls below the lowest temperature of the air.

The amount of moisture in the air is indicated by the Dew Point. The higher the dew point the greater the amount of moisture present.

The Relative Humidity indicates what may be called the dryness of the air. It shows the proportion the amount of moisture in the air bears to the amount it might contain if completely saturated. If the relative humidity is low then the air has a great capacity to take up moisture and evaporation will proceed rapidly.

Meteorological Tables.

METEOROLOGICAL OBSERVATIONS FOR

Day of the Month	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m.	2 p. m.	9 p. m.	Mean.	Maximum.	Minimum.	Solar.	Terrestrial.	7 a. m.	2 p. m.	9 p. m.	Mean.
1	25	41	34	33⅓	40	10	33	12	24.640	24.500	24.500	24.547
2	26	38	25	29⅔	38	26	42	8	24.640	24.750	24.690	24.693
3	36	60	55	50⅓	53	23	24	11	24.380	24.320	24.360	24.353
4	32	30	20	27⅓	64	28	..	6	24.490	24.620	24.590	24.567
5	18	25	21	21⅓	55	18	..	11	24.515	24.610	24.690	24.605
6	7	10	-2	5	24	6	..	15	24.690	24.675	24.790	24.718
7	-15	8	-9	-5⅓	13	-15	45	11	24.780	24.780	24.840	24.800
8	-12	-15	-4	-10⅓	15	-12	48	9	24.840	24.790	24.880	24.837
9	-14	19	1	2	24	-14	40	8	24.840	24.840	24.950	24.877
10	1	41	14	18⅔	38	18	44	26	24.890	24.890	25.065	24.948
11	8	40	24	24	42	10	36	11	24.950	24.740	24.490	24.727
12	34	33	25	30⅔	44	9	26	..	24.330	24.500	24.680	24.503
13	5	14	-10	3	37	20	7	25	24.765	24.590	24.790	24.715
14	-15	-4	-17	-12	27	-16	..	4	24.915	24.985	25.070	24.990
15	-28	2	-17	-14⅓	2	-28	60	7	25.075	24.990	24.965	25.010
16	-15	21	-1	1⅔	7	-17	65	8	24.760	24.685	24.750	24.731
17	6	30	16	17⅓	41	0	35	14	24.835	25.040	25.195	25.023
18	6	39	21	22	41	2	39	9	25.205	25.100	24.990	25.098
19	16	37	2	18⅓	40	13	14	12	24.835	24.790	24.895	24.840
20	-8	9	-2	-⅓	10	-8	41	5	24.815	24.740	24.755	24.770
21	-3	38	24	19⅔	45	-6	37	..	24.690	24.690	24.850	24.743
22	17	56	43	38⅔	58	13	..	..	24.840	24.795	24.925	24.853
23	19	37	25	27	38	18	7	..	25.020	24.960	24.800	24.927
24	27	48	40	38⅓	50	22	39	..	24.710	24.790	24.840	24.780
25	20	61	51	44	62	19	38	..	24.975	24.985	25.090	25.017
26	52	56	46	51⅓	71	35	35	..	25.040	25.085	25.140	25.088
27	26	66	35	42⅓	70	26	36	..	25.120	24.990	25.000	25.037

THE MONTH OF JANUARY, 1888.

Day of the Month	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATURE OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.	Beginning	Ending	Inches rain, melted snow	7 a. m.	2 p. m.	9 p. m.	Daily movement, miles
1	40	17	44	4	0	14	...	...	...	NW	E	N	100
2	53	66	40	11	28	4	...	...	...	N	SW	NW	50
3	64	58	59	25	45	41	...	...	...	SW	SW	W	96
4	61	68	58	20	21	7	...	...	...	W	E	E	45
5	61	63	59	6	14	9	11 am	5 pm	.08	N	E	E	125
6	58	30	10	-5	-15	-34	...	...	...	E	E	SE	157
7	4	26	25	-65	-20	-34	...	...	...	SW	S	N	81
8	20	43	13	-40	-4	-40	...	...	...	W	N	NW	69
9	9	51	30	-55	3	23	...	...	...	N	NW	NW	62
10	30	54	40	23	26	-6	...	...	...	W	W	N	71
11	50	62	67	-8	28	15	...	...	...	SE	SE	N	80
12	75	33	67	27	8	16	...	...	...	W	W	W	445
13	38	25	25	-15	-15	-36	3.30 p m	...	...	NW	E	NE	165
14	4	14	4	-65	-40	-67	...	9 am	0.21	...	SE	NW	75
15	9	32	4	-95	-21	-67	...	...	...	...	N	NE	59
16	4	59	22	-65	9	-30	...	...	...	W	NE	N	66
17	47	58	59	-12	17	4	...	...	...	W	W	S	47
18	47	51	59	-12	22	9	...	...	...	S	SE	W	83
19	68	40	32	7	15	-21	...	...	...	N	S	S	167
20	30	49	19	-31	-7	-33	...	...	...	E	E	S	83
21	16	57	50	-36	24	8	...	...	...	W	SE	...	72
22	69	71	85	8	47	39	...	...	...	W	E	NW	138
23	71	56	63	11	23	14	...	...	...	NW	...	W	80
24	66	23	22	17	12	4	...	...	...	W	W	NW	264
25	62	31	50	9	30	33	...	...	...	W	W	N	178
26	51	44	58	34	34	32	...	...	...	W	W	...	67
27	65	40	72	16	44	27	...	...	...	N	SE	NW	17

METEOROLOGICAL OBSERVATIONS FOR

Day of the Month.....	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....	Maximum....	Minimum....	Solar.....	Terrestrial...	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....
28	27	65	34	42	69	26	37	..	24.975	24.940	24.920	24.945
29	19	62	31	37⅓	67	28	33	..	24.890	24.730	24.840	24.820
30	26	67	34	42⅓	70	20	34	..	24.890	24.875	24.940	24.902
31	25	65	38	42⅔	68	26	35	..	24.940	24.890	24.930	24.920
Sums..	368	1099	597	688	1323	310	..	..	.....	.....	.....	.....
Means.	11.9	35.5	19.3	22.2	42.7	10	..	..	24.815	24.796	24.839	24.818

THE MONTH OF JANUARY, 1888.—*Concluded.*

Day of the Month.....	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATU E OF DEW POINT.			PRECIPITATIO[illegible]			WIND.			
	7 a. m.....	2 p. m.....	9 p. m.....	7 a. m.....	2 p. m.....	9 p. m.....	Beginning....	Ending.....	Inches rain, melted snow.	7 a. m.....	2 p. m.....	9 p. m.....	Daily movement, miles.
28	66	44	72	17	42	26	...	...	...	W	SE	NW	16
29	37	41	40	3	38	9	...	...	...	S	S	...	11
30	65	49	44	16	47	14	...	...	...	N	SE	...	8
31	63	48	50	14	45	21	...	...	...	W	S	N	8
Sums..	....	....	....	....	....	..	...	...	0.29	...	...	...	2985
Mean..	45.26	45.26	43.29	-7.61	16.03	.03	...	...	...	...	...	...	...
Av'ge..	....	44.60	....	....	2.82	..	...	...	...	...	...	...	...

METEOROLOGICAL OBSERVATIONS FOR

Day of the Month.....	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....	Maximum....	Minimum....	Solar.....	Terrestrial...	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....
1	28	60	42	43⅓	64	29	34	..	24.890	24.835	24.890	24.871
2	29	48	41	39⅓	50	29	12	..	24.890	24.865	24.900	24.885
3	36	40	35	37	41	36	5	..	24.840	24.765	24.775	24.793
4	31	35	28	31⅓	35	27	37	..	24.840	24.860	24.850	24.850
5	12	34	23	23	36	14	38	..	24.875	24.790	24.685	24.783
6	23	41	33	32⅓	43	20	31	..	24.720	24.650	24.595	24.655
7	27	44	35	35⅓	46	27	31	..	24.565	24.560	24.595	24.573
8	2[illegible]	59	50	45⅔	63	27	33	..	24.540	24.515	24.495	24.516
9	31	47	42	40	52	31	38	..	24.625	24.530	24.495	24.550
10	36	41	35	37⅓	43	30	24	..	24.565	24.600	24.625	24.586
11	24	53	59	45⅓	57	25	27	..	24.605	24.615	24.650	24.623
12	34	64	44	47⅓	68	34	33	..	24.785	24.775	24.765	24.775
13	39	59	47	48⅓	63	37	37	..	24.640	24.715	24.885	24.746
14	23	36	22	27	42	20	2	..	25.165	25.195	25.215	25.191
15	16	57	33	35⅓	61	17	37	..	25.160	25.140	25.190	25.163
16	27	63	38	42⅔	66	26	39	..	25.180	25.110	25.135	25.141
17	22	62	39	41	65	22	57	..	25.055	24.920	24.790	24.921
18	39	50	43	44	53	32	64	..	24.460	24.540	24.710	24.570
19	37	50	33	40	52	24	63	..	24.890	24.830	24.765	24.828
20	26	51	35	37⅓	50	21	68	11	24.740	24.790	24.860	24.796
21	18	40	32	30	46	19	35	11	24.740	24.765	24.975	24.826
22	15	48	25	29⅓	55	16	55	12	25.080	25.020	25.040	25.046
23	18	57	32	35⅔	62	18	55	13	24.835	24.770	24.745	24.783
24	32	41	27	33⅓	47	27	64	8	24.955	24.800	24.755	24.836
25	26	39	24	29⅔	42	26	57	15	24.770	24.740	24.855	24.788
26	32	44	28	34⅔	50	16	65	1	24.855	24.890	24.965	24.903
27	16	60	38	38	65	25	60	21	24.845	24.690	24.665	24.733

THE MONTH OF FEBRUARY, 1888.

Day of the Month.....	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATURE OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m.....	2 p. m.	9 p. m.....	7 a. m.....	2 p. m.....	9 p. m.....	Beginning....	Ending	Inches rain, melted snow..	7 a. m.....	2 p. m.....	9 p. m.....	Daily movement, miles...
1	56	58	61	14	44	29	...	...	...	W	SE	N	51
2	57	73	76	16	40	34	8 am	3 pm	.23	S	NE	NE	102
3	73	84	100	28	35	35	8 am	7 pm	.13	N	S	...	84
4	69	72	67	22	27	18	...	...	...	N	...	E	115
5	50	81	61	-4	29	12	...	...	...	S	S	SW	138
6	61	68	71	12	31	25	...	...	...	W	SW	SE	131
7	66	56	72	17	29	27	...	...	...	S	SW	SE	103
8	67	67	68	18	48	40	...	...	...	W	W	N	173
9	69	59	47	22	33	23	...	...	...	E	SE	W	103
10	64	68	81	25	31	30	...	...	...	E	S	...	124
11	62	52	78	13	36	52	...	...	...	N	W	W	274
12	63	60	70	23	50	35	...	...	...	N	S	...	128
13	67	67	66	29	48	36	...	...	...	W	W	W	185
14	61	64	74	12	25	16	...	...	...	W	S	W	441
15	58	40	43	3	33	13	...	...	...	W	SE	N	430
16	66	46	42	17	42	17	...	...	...	W	SE	...	101
17	60	41	75	10	38	32	...	...	...	W	SE	NW	180
18	43	80	62	18	44	31	...	...	...	W	E	N	279
19	48	68	71	19	40	25	...	...	...	W	W	S	286
20	76	39	54	20	27	20	...	...	...	NW	S	NE	118
21	61	52	70	6	24	23	...	...	...	E	N	N	178
22	57	53	40	2	32	4	...	...	...	NW	W	W	93
23	61	45	70	6	36	23	...	...	...	...	S	...	126
24	70	38	66	23	17	17	...	...	...	NW	NW	N	270
25	65	43	62	16	18	13	...	...	...	E	NW	NW	191
26	70	49	56	23	26	14	...	...	...	NW	NW	S	312
27	58	58	42	3	45	17	...	...	...	NW	N	N	112

METEOROLOGICAL OBSERVATIONS FOR

Days of the Month.....	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....	Maximum....	Minimum....	Solar.....	Terrestrial....	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....
28	30	62	50	47⅓	67	30	60	11	24.795	24.540	24.565	24.633
29	27	28	24	26⅓	40	25	8	9	24.655	24.625	24.590	24.623
..	..	..	..	....	.	..	..	..	.....	.....	.....	.....
..	..	..	..	....	..	..	..	..	.....	.....	.....	.....
Sums..	782	1473	1037	1077½	1524	730	1169	..	.....	.....	.....	.....
Means.	27.	48.7	35.8	37.13	53	25	40.3	..	24.812	24.774	24.794	24.793

THE MONTH OF FEBRUARY, 1888.—*Concluded.*

Days of the Month	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATURE OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m.	*2 p. m.*	*9 p. m.*	*7 a. m.*	*2 p. m.*	*9 p. m.*	*Beginning*	*Ending*	*Inches rain, melted snow*	*7 a. m.*	*2 p. m.*	*9 p. m.*	*Daily movement, miles*
28	58	41	49	17	38	31	...	...	...	NW	SE	W	240
29	66	67	62	17	18	13	...	...	...	E	E	E	156
..	....	....	....	....	....	..	...	...	...	...	...	...	...
..	....	....	....	....	....	..	...	...	...	...	...	...	...
Sums..	1802	1689	1856	447	985	705	...	...	...	. .	...	...	...
Mean..	62.2	58.2	64	15.4	34	24.3	...	...	0.36	...	...	...	5224
Av'ge..	....	61.46	....	....	24.52	..	...	...	...	...	...	...	...

METEOROLOGICAL OBSERVATIONS FOR

Day of the Month.....	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....	Maximum....	Minimum.....	Solar.....	Terrestrial....	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....
1	23	20	15	19⅓	25	13	29	6	24.580	24.675	24.840	24.698
2	10	27	19	18⅔	28	11	91	12	24.960	24.980	25.080	25.007
3	9	27	15	17	28	9	87	14	24.890	24.760	24.740	24.797
4	9	24	12	15	26	4	88	4	24.745	24.815	24.890	24.817
5	3	25	15	14⅓	30	3	76	11	24.840	24.735	24.730	24.768
6	15	44	29	29⅓	48	11	70	10	24.640	24.595	24.715	24.650
7	20	45	30	31⅔	53	15	57	13	24.750	24.690	24.635	24.692
8	23	58	36	39	61	22	72	11	24.505	24.440	24.465	24.470
9	32	29	20	27	36	20	4	0	24.540	24.675	24.815	24.677
10	12	39	28	26⅓	45	13	76	13	24.965	25.040	25.175	25.060
11	20	52	34	35⅓	59	19	56	15	25.215	25.165	25.160	25.180
12	31	68	43	47⅓	71	26	59	14	25.125	25.090	25.140	25.118
13	33	68	41	47⅓	74	30	53	14	25.040	24.915	24.890	24.948
14	34	70	50	51⅓	75	32	71	14	24.890	24.870	24.960	24.907
15	35	55	39	43	59	28	7	8	25.055	25.055	25.090	25.067
16	32	67	40	46⅓	71	28	..	15	24.990	24.935	24.965	24.963
17	30	67	40	45⅔	74	29	56	16	24.940	24.815	24.705	24.820
18	35	69	36	46⅔	75	30	37	16	24.515	24.350	24.490	24.452
19	27	34	20	27	38	18	..	0	24.740	24.740	24.680	24.720
20	27	37	31	31⅔	49	18	..	11	24.640	24.635	24.840	24.705
21	20	35	22	25⅔	37	20	75	12	25.040	24.050	25.080	25.057
22	22	50	35	35⅔	57	19	61	13	24.930	24.840	24.740	24.837
23	35	61	40	45⅓	65	32	28	16	24.715	24.630	24.590	24.645
24	37	59	36	44	62	30	57	7	24.515	24.465	24.560	24.513
25	22	26	17	21⅔	29	14	.	..	24.675	24.675	24.740	24.697
26	13	21	14	16	24	12	..	7	24.795	24.805	24.890	24.830
27	11	35	40	28⅔	39	8	54	15	24.825	24.690	24.890	24.802

THE MONTH OF MARCH, 1888.

Day of the Month	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATURE OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.	Beginning	Ending	Inches rain, melted snow	7 a. m.	2 p. m.	9 p. m.	Daily movement, miles
1	61	58	57	12	7	2	2 pm	8 pm	0.10	E	NE	S	152
2	48	54	62	-6	13	8	...	...	...	S	E	NW	92
3	47	66	57	-8	17	2	...	...	...	NW	NE	E	87
4	47	75	52	-8	17	-3	...	...	...	E	E	S	106
5	33	52	57	-20	10	2	...	...	...	...	S	S	96
6	57	29	57	2	14	16	...	...	...	N	W	W	246
7	58	50	58	7	27	17	...	...	...	S	E	...	141
8	61	42	64	12	35	25	...	...	...	...	E	E	126
9	80	67	72	27	20	12	10.30 am	5 pm	0.15	E	E	S	163
10	52	58	67	-3	26	18	...	...	...	E	S	E	131
11	72	35	53	12	25	19	...	...	...	S	S	...	99
12	59	38	55	19	42	28	...	...	...	S	S	S	113
13	80	46	53	28	46	25	...	...	...	W	SE	S	120
14	63	40	49	23	45	31	...	...	...	S	SE	N	134
15	72	70	75	27	46	32	...	...	...	E	E	...	123
16	70	58	44	23	52	20	...	...	...	N	NW	...	162
17	89	66	52	27	55	24	...	...	...	W	SE	...	125
18	72	63	73	27	56	28	8 pm	...	...	NW	SE	N	240
19	54	72	44	13	26	1	...	6 am	0.18	N	SW	W	326
20	66	56	69	17	23	22	3 pm	6 pm	0.19	SE	NE	N	198
21	72	72	61	12	27	12	...	...	...	S	S	S	172
22	74	68	64	16	40	24	...	...	...	W	SE	E	62
23	64	58	68	24	46	30	...	...	...	E	SE	NW	119
24	48	72	64	19	50	25	4 pm	4.30 pm	0.11	NW	SE	NE	160
25	61	65	60	12	16	5	...	...	...	N	N	N	260
26	64	59	55	3	9	9	...	...	...	NE	NE	N	67
27	50	54	68	-4	20	30	...	...	...	NE	S	S	6

METEOROLOGICAL OBSERVATIONS FOR

Days of the Month.....	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....	Maximum.....	Minimum.....	Solar.....	Terrestrial.....	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....
28	33	50	40	41	56	21	16	14	24.825	24.715	24.690	24.742
29	35	64	47	48⅔	69	32	59	16	24.615	24.580	24.740	24.645
30	38	73	49	53⅓	75	39	45	19	24.850	24.795	24.860	24.835
31	41	73	58	57⅓	79	35	60	17	24.900	24.840	24.785	24.842
Sums..	767	1472	991	1076⅔	1617	641	1443	353	.....	.....	.....	.....
Means.	24.7	47.5	32	34.7	49	27	55.5	11.8	24.824	24.776	24.814	24.805

THE MONTH OF MARCH, 1888.—*Concluded.*

Day of the Month.....	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATURE OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m.....	2 p. m.....	9 p. m.....	7 a. m.....	2 p. m.....	9 p. m.....	Beginning.....	Ending.....	Inches rain, melted snow..	7 a. m.....	2 p. m.....	9 p. m.....	Daily movement, miles..
28	71	87	59	25	46	27	...	...	...	SE	W	SE	6
29	64	56	66	24	48	33	...	...	...	NW	W	N	81
30	50	32	86	21	41	45	...	...	...	N	S	W	30
31	76	32	50	34	41	42	...	...	...	NW	SE	N	96
Sums..	1935	1750	1871	417	986	614	...	...	...	...	...	...	...
Means.	62.4	56.5	60.3	13.4	31.8	19.8	...	...	0.73	...	...	...	4039
Av'ge..	....	59.74	....	....	21.77	..	...	...	...	..	..	...	...

METEOROLOGICAL OBSERVATIONS FOR

Day of the Month.....	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....	Maximum....	Minimum....	Solar.....	Terrestrial...	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....
1	54	70	53	59	75	49	60	14	24.740	24.745	24.825	24.770
2	42	67	50	53	70	45	60	18	24.790	24.840	24.915	24.848
3	40	67	50	52⅓	71	30	44	12	24.815	24.730	24.540	24.695
4	41	69	64	58	73	35	66	16	24.520	24.640	24.840	24.667
5	47	62	45	51⅓	66	46	73	18	24.940	25.015	25.095	25.017
6	39	67	51	52⅓	73	33	68	16	25.140	25.190	25.155	25.135
7	45	71	55	57	75	37	28	17	25.105	24.995	24.950	25.017
8	47	61	49	52⅓	69	48	12	13	24.820	24.715	24.740	24.758
9	59	61	42	50⅔	68	44	60	16	24.880	24.890	24.990	24.920
10	38	67	49	51⅓	71	31	65	16	24.975	24.940	25.005	24.973
11	43	58	41	47⅓	63	30	62	8	25.140	25.200	25.290	25.210
12	38	73	64	58⅓	80	30	57	16	25.240	25.125	15.115	25.160
13	52	81	59	64	84	36	59	17	15.105	25.065	25.090	25.087
14	52	78	58	62⅔	84	41	54	14	25.055	24.990	25.015	25.020
15	55	76	59	63⅓	83	50	40	16	25.090	24.975	24.885	24.983
16	53	78	51	60⅔	82	43	13	14	24.795	24.690	24.870	24.785
17	42	58	46	48⅔	63	42	61	15	25.140	25.090	25.140	25.123
18	47	76	50	57⅔	82	32	33	12	24.995	24.930	25.095	25.007
19	39.5	70.5	53	54⅓	79	40	56	14	25.140	25.000	25.040	25.060
20	44	80	60	61⅓	86	36	55	17	25.040	24.965	24.940	24.982
21	49	84	60	64⅓	91	42	50	18	24.965	24.890	24.890	24.915
22	65	78	65	69⅓	87	48	20	24	24.940	24.955	25.040	24.978
23	48	76	58	69⅔	83	53	53	21	25.125	24.940	24.940	25.002
24	49	69	55	57⅔	73	53	52	..	24.870	24.740	24.665	24.758
25	45	67	56	56	76	46	2	..	24.615	24.465	24.640	24.573
26	49	55	47	50⅓	63	48	45	..	24.840	24.890	24.895	24.875
27	44	44	43	43⅔	50	38	0	..	24.840	24.840	24.999	24.890

THE MONTH OF APRIL, 1888.

Day of the Month.....	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATURE OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m.....	2 p. m	9 p. m.....	7 a. m.....	2 p. m.....	9 p. m.....	Beginning....	Ending	Inches rain, melted snow.	7 a. m	2 p. m.....	9 p. m.....	Daily movement, miles..
1	64	60	70	42	55	43	...	...	...	NE	W	W	281
2	69	49	68	33	47	40	...	...	...	S	W	W	275
3	68	66	74	30	55	42	...	...	...	W	SW	NW	228
4	76	51	51	34	50	46	...	...	...	NW	W	NW	357
5	59	59	71	33	48	36	...	...	...	NE	SE	S	257
6	75	71	62	32	57	38	...	...	...	S	SE	SE	30
7	71	64	70	36	58	46	...	...	...	SE	SE	W	103
8	72	68	93	39	50	47	4 pm	5 pm	0.15	SE	E	NE	166
9	73	59	69	41	44	33	...	...	...	NW	N	SE	319
10	75	58	54	31	52	33	...	...	...	NE	NW	N	193
11	70	56	68	34	42	31	...	...	...	S	E	E	166
12	75	57	51	31	57	46	...	...	...	N	SE	N	131
13	69	61	72	42	66	50	...	...	...	...	SE	...	129
14	69	53	67	42	59	47	...	...	...	E	NW	W	181
15	76	55	52	48	59	41	...	...	...	E	SE	...	168
16	70	36	62	43	49	38	...	...	...	...	NW	N	212
17	54	42	46	26	35	27	...	...	...	E	S	E	213
18	59	38	64	33	48	38	...	...	...	...	NW	...	92
19	54	48	63	24	50	41	...	...	...	...	S	N	...
20	63	38	58	32	52	45	...	...	...	...	...	...	...
21	54	29	48	33	49	40	...	...	...	...	N	N	154
22	51	53	65	44	59	53	...	...	...	...	NE	NE	161
23	73	38	61	40	48	45	...	...	...	E	SW	S	184
24	80	51	70	43	50	46	...	...	...	W	SE	SE	223
25	85	45	55	41	45	40	...	...	...	NW	S	W	257
26	48	54	79	30	39	41	12 m	2 pm	T.	S	S	E	156
27	85	78	77	40	37	36	...	9 am	1.08	NE	NE	NE	40

METEOROLOGICAL OBSERVATIONS FOR

Day of the Month.....	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....	Maximum.....	Minimum.....	Solar.....	Terrestrial.....	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....
28	35	43	37	38⅓	46	37	37	..	25.220	25.265	25.290	25.258
29	39	54	43	45⅓	60	38	61	..	25.190	24.990	24.960	25.047
30	43	66	66	58⅓	73	37	61	..	24.890	24.790	24.765	24.815
..	..	..	..	....	..	..	..	..	.....	.....	.....	.....
Sums..	1373	2026	1579	1659⅔	2129	1218	..	..	.....	.....	.....	.....
Means.	45.8	67.6	52.6	55.33	73.3	40.6	46.9	..	24.965	24.915	24.954	24.944

THE MONTH OF APRIL, 1888.—*Concluded.*

Days of the Month	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATURE OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.	Beginning	Ending	Inches rain, melted snow	7 a. m.	2 p. m.	9 p. m.	Daily movement, miles
28	72	55	82	27	28	32	...	...	...	N	NE	NE	118
29	83	64	77	34	42	36	...	...	...	S	SE	S	161
30	77	53	57	36	48	50	...	...	...	...	S	...	112
..	....	....	....	....	....	..	...	...	...	...	...	...	...
Sums..	....	....	....	....	....	..	...	...	...	...	...	...	...
Mean..	69.0	53.6	65.2	35.8	49.3	40.9	...	...	1.23	...	...	...	5167
Av'ge..	....	62.60	....	....	42.0	..	...	...	..	...	...	...	...

METEOROLOGICAL OBSERVATIONS FOR

Day of the Month.....	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....	Maximum.....	Minimum.....	Solar.....	Terrestrial..	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....
1	45	74	60	59⅔	80	46	..	..	24.660	24.590	24.510	24.587
2	48	46	45	46⅓	60	46	..	..	24.580	24.540	24.640	24.587
3	44	61	52	52⅓	68	48	..	..	24.780	24.720	24.765	24.755
4	46	62	52	53⅓	73	45	..	..	24.750	24.700	24.740	24.730
5	56	59	48	54⅓	67	46	..	..	24.715	24.650	24.690	24.685
6	49	36	36	40⅓	51	37	..	..	24.690	24.970	25.040	24.900
7	36	46	44	42	50	38	..	..	25.140	25.120	25.080	25.113
8	41	63	52	52	72	40	..	12	24.960	24.860	24.860	24.893
9	59	71	61	63⅔	70	43	..	14	24.840	24.740	24.670	24.750
10	57	60	56	57⅔	60	48	..	8	24.665	24.630	24.640	24.645
11	41	58	42	47	62	36	..	6	24.890	24.890	25.070	24.950
12	42	64	60	55⅓	69	30	..	10	25.020	24.920	24.940	24.960
13	59	67	52	59⅓	71	38	..	14	25.040	25.040	25.040	25.040
14	51	79	65	65	84	41	..	12	24.940	24.840	24.820	24.867
15	53	60	51	54⅔	72	50	..	10	24.900	24.860	24.940	24.900
16	45	65	55	55	68	40	..	10	24.820	24.640	24.660	24.707
17	40	55	43	46	58	34	..	1	24.740	24.780	24.940	24.820
18	43	63	51	52⅓	68	30	..	2	24.915	24.800	24.790	24.835
19	54	72	64	63⅓	75	45	..	17	24.840	24.775	24.740	24.785
20	55	66	58	59⅔	73	41	..	..	24.790	24.790	24.740	24.773
21	52	55	56	54⅓	62	48	..	19	24.820	24.740	24.790	24.783
22	57	55	52	54⅔	65	39	..	10	24.860	24.900	24.860	24.873
23	49	53	49	50⅓	55	45	..	3	24.830	24.770	24.810	24.803
24	56	63	55	58	63	41	..	11	24.840	24.810	24.870	24.840
25	54	62	53	56⅓	65	43	..	9	24.910	24.700	24.690	24.767
26	51	61	45	52⅓	61	42	..	11	24.740	24.690	24.820	24.750
27	43	47	45	45	51	41	..	3	24.850	24.890	24.990	24.910

THE MONTH OF MAY, 1888.

Day of the Month.....	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATURE OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m.....	2 p. m.....	9 p. m.....	7 a. m.....	2 p. m.....	9 p. m.....	Beginning.....	Ending.....	Inches rain, melted snow...	7 a. m.....	2 p. m.....	9 p. m.....	Daily movement, miles....
1	85	66	44	41	62	38	...	...	...	S	S	N	179
2	66	92	78	37	44	39	9.45 am	4.30 pm	0.33	...	N	...	143
3	63	40	63	32	36	40	...	...	...	N	S	S	200
4	72	45	75	37	41	44	9 pm	9.30 pm	0.03	...	SW	N	150
5	55	52	66	40	41	37	8 pm	11.50 pm	0.50	N	SW	N	164
6	80	96	91	43	36	34	8.50 am	...	...	NE	NW	N	266
7	91	79	78	34	40	37	...	8 am	0.92	N	NE	...	190
8	84	55	46	38	47	31	...	...	...	...	S	...	135
9	43	41	54	36	46	44	...	...	...	W	W	SW	272
10	45	63	65	36	47	44	...	...	...	N	S	N	214
11	53	27	61	25	24	29	...	...	...	N	NW	...	215
12	61	38	53	29	38	43	...	...	...	...	S	...	116
13	43	41	35	36	43	25	...	...	...	N	E	SE	86
14	69	25	48	41	40	45	...	...	...	...	N	W	167
15	52	39	69	36	35	41	...	...	...	N	S	...	210
16	71	52	70	36	47	46	...	...	...	S	...	E	56
17	84	54	62	35	39	31	4 am	5.30 am	0.14	SE	NW	N	111
18	62	46	69	31	42	41	...	...	...	S	SE	...	33
19	64	73	70	42	63	54	...	...	...	E	SW	S	142
20	38	63	49	30	40	31	...	...	...	...	...	...	96
21	81	54	65	46	39	44	...	...	...	SE	SE	...	120
22	61	70	87	44	46	48	2 pm	...	...	NE	N	N	55
23	93	81	80	47	47	43	...	12m	0.78	SE	SE	...	70
24	60	53	70	42	45	46	...	...	...	S	S	S	105
25	76	64	81	46	50	47	2 pm	4 pm	0.09	S	SE	E	65
26	81	63	78	45	48	39	...	...	...	SW	W	N	140
27	70	85	78	34	41	39	5 am	9 pm	0.60	W	NW	NW	160

METEOROLOGICAL OBSERVATIONS FOR

Days of the Month.....	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m......	*2 p. m.*.....	*9 p. m.*.....	*Mean*.....	*Maximum*....	*Minimum*....	*Solar*.....	*Terrestrial*....	*7 a. m.*.....	*2 p. m.*.....	*9 p. m.*.....	*Mean*.....
28	50	61	50	53⅔	64	41	..	9	25.040	25.000	24.990	25.010
29	52	68	55	58⅓	69	40	..	9	25.010	24.940	24.940	24.963
30	61	70	52	61	71	47	..	6	25.000	25.000	25.010	25.003
31	57	75	61	64⅓	76	43	..	8	24.960	24.880	24.910	24.917
Sums..	1546	1897	1620	1687⅔	2053	1292	..	..	.....	.....	.....	.....
Means.	50	61.2	52.3	54.44	66.2	41.7	..	9.3	24.856	24.812	24.838	24.835

THE MONTH OF MAY, 1888.—*Concluded.*

Day of the Month.....	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATURE OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m.....	2 p. m.....	9 p. m.....	7 a. m.....	2 p. m.....	9 p. m.....	Beginning.....	Ending.....	Inches rain, melted snow.	7 a. m.....	2 p. m.....	9 p. m.....	Daily movement, miles.
28	55	40	80	34	36	44	...	...	...	NW	NW	...	90
29	75	38	59	44	42	41	...	...	...	S	SE	...	70
30	49	33	60	42	41	38	...	...	...	N	E	...	122
31	71	32	44	48	24	39	...	...	...	...	N	...	58
Sums..	....	....	....	....	....	..	...	...	...	...	...	...	...
Mean..	66.2	54.8	65.4	38.3	42.3	40.1	...	...	...	...	...	...	4200
Av'ge..	....	62.16	....	....	40.16	..	...	...	339	...	...	...	...

METEOROLOGICAL OBSERVATIONS FOR

Day of the Month.....	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....	Maximum.....	Minimum.....	Solar.....	Terrestrial.....	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....
1	60	62	54	58⅔	67	51	79	9	24.990	24.990	25.020	25.000
2	60	71	60	63⅔	74	47	27	7	24.940	24.890	24.860	24.897
3	62	75	62	66⅓	81	50	57	10	24.880	24.740	24.560	24.727
4	54	77	60	63⅔	78	56	78	12	24.610	24.620	24.700	24.643
5	56	71	65	64⅔	73	46	62	14	24.890	24.890	24.990	24.923
6	56	73	68	66⅓	78	47	61	9	25.015	24.890	24.790	24.898
7	63	85	75	74⅓	88	50	59	10	24.770	24.640	24.570	24.660
8	60	72	60	64	73	57	65	11	24 840	24.740	24.940	24.840
9	59	73	57	63	76	51	61	12	25.065	25.040	25.140	25.082
10	56	77	65	66	79	44	65	8	25.090	24.990	24.965	25.015
11	71	82	65	72⅔	88	51	63	13	24.940	24.910	24.890	24.913
12	65	82	65	70⅔	....	....	*154	*40	24.890	24.790	24.790	24.823
13	62	77	58	65⅔	....	....	152	45	24.815	24.815	24.840	24.823
14	..	..	..	....	....	....	..	..	24.880	24.865	24.850	24.865
15	72	92	80	81⅓	....	....	153	44	24.890	24.815	24.790	24.832
16	74	85	73	77⅓	....	....	151	44	24.790	24.790	24.915	24.832
17	69	85	73	75⅔	....	....	151	45	24.865	24.790	24.740	24.798
18	65	83	68	72	....	....	*156	*44	24.715	24.640	24.590	24.682
19	65	64	58	62⅓	79	55	72	11	24.640	24.540	24.590	24.590
20	58	68	53	59⅔	69	57	53	14	24.620	24.640	24.715	24.658
21	57	70	62	63	71	49	76	12	24.740	24.740	24.740	24.740
22	59	72	59	63⅓	74	49	80	17	24.890	24.790	24.815	24.832
23	53	72	50	58⅓	75	42	71	9	24.940	24.740	24.990	24.890
24	55	72	60	62⅓	75	48	79	10	24.920	24.915	24.940	24.925
25	57	70	67	64⅔	85	53	46	8	24.840	24.790	24.740	24.790
26	65	80	63	69⅓	83	56	69	11	24.740	24.815	24.940	24.832
27	62	88	67	72⅓	89	48	65	8	24.890	24.790	24.815	24.832

*In Radiation from June 12 to 18, incl., the readings of the instruments are given.

THE MONTH OF JUNE, 1888.

Day of the Month.....	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATURE OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m.....	2 p. m.....	9 p. m.....	7 a. m.....	2 p. m.....	9 p. m.....	Beginning.....	Ending.....	Inches rain, melted snow.	7 a. m.....	2 p. m.....	9 p. m.....	Daily movement, miles.
1	53	69	88	43	52	50	5.30 pm	6.30 pm	0.33	...	S	...	....
2	68	45	58	49	48	45	...	...	...	S	SW	..	....
3	74	58	64	53	59	50	...	...	...	W	SE	SE	....
4	42	23	34	31	36	32	...	...	...	N	NW	W	....
5	42	37	75	35	43	57	...	...	...	SW	SE	W	....
6	61	53	58	45	55	53	...	...	...	N	S	...	....
7	55	28	62	47	48	61	...	...	...	W	SW	W	....
8	68	57	58	49	56	45	...	...	...	NW	NW	NW	....
9	67	69	66	48	62	46	...	...	...	SW	SW	NW	173
10	77	42	56	49	52	49	...	...	...	NE	SE	SW	69
11	52	36	56	53	53	49	...	...	...	SW	SE	NW	99
12	56	36	56	49	53	49	...	...	...	W	SE	W	95
13	74	56	61	53	60	45	...	...	...	E	SE	W	80
14	Rec	ord		lost			...	...	...	...	...	...	92
15	69	43	44	61	66	56	...	...	...	W	S	SW	95
16	50	38	69	54	57	62	...	...	...	SW	E	SE	148
17	59	47	46	54	62	51	...	...	...	N	S	W	218
18	65	52	58	53	64	53	...	...	...	W	SW	W	121
19	65	65	83	53	52	53	...	...	...	W	NW	NW	136
20	61	50	52	45	49	36	1 pm	5 pm	0.14	W	NW	W	312
21	36	33	59	30	41	48	...	...	...	NW	NW	SW	343
22	43	31	52	36	40	41	...	...	...	NW	NW	SW	266
23	63	65	68	41	59	40	...	...	...	SE	NW	SW	156
24	70	45	48	46	50	40	...	...	...	SW	S	SE	102
25	77	55	62	50	53	54	...	...	...	NW	S	NW	....
26	52	29	55	47	45	47	...	...	...	NW	NW	SE	161
27	64	40	49	50	61	47	...	...	...	S	S	E	....

METEOROLOGICAL OBSERVATIONS FOR

Day of the Month	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m.	2 p. m.	9 p. m.	Mean	Maximum	Minimum	Solar	Terrestrial	7 a. m.	2 p. m.	9 p. m.	Mean
28	67	95	70	77⅓	97	54	63	10	24.765	24.740	24.790	24.765
29	73	90	79	80⅔	94	58	66	11	24.840	24.790	24.840	24.823
30	70	85	72	75⅔	89	60	70	12	24.940	24.890	24.840	24.890
..	..	..	..	....	..	..	..	..	.....	.....	.....	.....
Sums..	1809	2248	1868	1975	1835	1179	..	..	.....	.....	.....	.....
Means.	62.4	77.5	64.4	68.1	....	....	64.5	10.8	24.854	24.801	24.826	24.827

THE MONTH OF JUNE, 1888.—*Concluded.*

Days of the Month.....	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATURE OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m.....	2 p. m.....	9 p. m.....	7 a. m.....	2 p. m.....	9 p. m.....	Beginning.....	Ending.....	Inches rain, melted snow..	7 a. m.....	2 p. m.....	9 p. m.....	Daily movement, miles..
28	45	28	64	45	56	57	...	...	...	NW	SE	SE	....
29	65	29	47	61	53	57	...	...	...	S	S	S	117
30	55	47	42	53	62	47	...	...	...	SW	S	N	142
..	....	....	....	....	....	..	...	...	...	...	...	...	....
Sums..	....	....	....	....	....	..	...	...	...	. .	...	...	....
Mean..	57.6	43.5	56.3	46.1	51.6	47.3	...	...	...	...	...	...	2930
Av'ge..	....	52.48	....	....	48.36	..	...	...	0.37	...	...	...	....

METEOROLOGICAL OBSERVATIONS FOR

Day of the Month	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m.	2 p. m.	9 p. m.	Mean	Maximum	Minimum	Solar	Terrestrial	7 a. m.	2 p. m.	9 p. m.	Mean
1	68	69	60	65⅔	84	58	76	9	24.840	24.84	24.790	24.823
2	57	82	68	69	87	51	67	6	24.840	24.815	24.940	24.865
3	68	86	70	74⅔	89	53	59	9	24.990	24.94	24.990	24.973
4	74	92	75	80⅓	94	55	63	12	25.065	25.040	25.040	25.048
5	68	87	76	77	90	62	59	13	24.940	25.015	24.990	24.982
6	67	95	70	77⅓	97	60	61	14	25.040	24.990	25.040	25.023
7	68	67	62	65⅔	83	63	67	9	25.065	25.040	25.040	25.048
8	65	78	62	68⅓	79	60	70	11	25.140	25.140	25.190	25.157
9	63	83	70	72	87	60	58	10	25.165	25.140	25.190	25.165
10	70	92	68	76⅔	95	55	57	11	25.140	25.090	25.090	25.107
11	71	97	74	80⅔	99	56	56	12	25.040	25.015	24.965	25.007
12	70	93	80	81	95	57	58	19	24.940	24.915	24.940	24.932
13	76	88	72	78⅔	90	75	70	20	25.040	25.040	25.090	25.057
14	70	81	72	74⅓	89	63	65	15	25.190	25.090	25.090	25.123
15	66	86	70	74	89	53	66	10	25.040	25.040	25.090	25.057
16	65	84	67	72	87	60	59	11	25.140	25.040	25.140	25.107
17	62	67	60	63	69	52	76	9	25.140	25.190	25.240	25.190
18	58	75	67	66⅔	80	56	63	11	25.165	25.190	25.240	25.197
19	64	86	69	73	89	53	60	12	25.215	25.190	25.165	25.190
20	69	75	63	69	87	55	71	13	25.165	25.165	25.240	25.190
21	71	84	68	74⅓	89	56	61	10	25.215	25.215	25.265	25.232
22	68	81	67	72	83	54	73	..	25.233	25.140	25.190	25.188
23	63	77	61	67	79	58	75	..	25.160	25.120	25.160	25.147
24	67	66	63	65⅓	78	62	79	..	25.135	25.065	25.090	25.097
25	68	85	69	74	86	62	58	..	25.065	25.020	25.040	25.042
26	65	80	70	71⅔	..	..	69	..	25.040	25.010	25.140	25.063
27	68	86	67	73⅔	87	..	63	..	25.040	25.040	25.140	25.073

THE MONTH OF JULY, 1888.

Day of the Month	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATURE OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.	Beginning	Ending	Inches rain, melted snow	7 a. m.	2 p. m.	9 p. m.	Daily movement, miles
1	58	63	73	53	56	51	2 pm	6 pm	0.09	W	W	W	101
2	71	39	46	48	55	46	...	...	...	NW	SE	W	87
3	58	31	55	53	52	53	...	...	...	W	SW	NW	87
4	54	21	40	56	46	49	...	...	...	SE	SE	SE	74
5	63	30	38	55	51	48	...	...	...	SW	W	E	69
6	58	32	55	52	61	53	...	...	...	W	SW	W	21
7	71	76	72	58	59	55	2 pm	3 pm	0.05	NW	W	SE	85
8	65	46	79	53	55	55	3.30 p m	4 pm	0.06	NE	N	SE	....
9	74	40	55	55	56	53	...	...	...	NE	SE	SE	100
10	52	37	46	51	62	46	...	...	...	SW	S	SW	80
11	60	36	36	56	65	45	...	...	...	SW	S	SW	81
12	48	29	29	49	56	45	...	...	...	SW	E	NW	120
13	38	40	49	48	61	52	...	...	...	NW	SE	W	190
14	64	41	53	57	55	54	...	...	...	SE	SW	S	....
15	57	42	48	50	60	49	...	...	...	SE	NW	SW	139
16	75	49	62	57	63	54	...	...	...	NW	S	NW	79
17	74	58	68	53	52	49	...	...	...	NW	NE	NE	136
18	78	40	45	51	49	45	...	...	...	SW	SE	SE	89
19	65	29	43	52	49	46	...	...	...	W	S	NE	87
20	51	51	74	50	56	55	4 pm	8 pm	0.20	S	N	W	95
21	60	41	67	56	57	57	...	...	...	NW	NE	...	124
22	71	48	85	58	59	62	...	...	...	E	SE	...	71
23	89	56	94	60	60	59	...	...	0.05	NW	SW	SE	....
24	85	90	89	62	63	60	...	...	0.15	S	SE	SE	90
25	81	38	63	62	57	56	...	...	...	SE	S	SW	97
26	70	35	64	55	50	57	...	...	...	S	W	W	148
27	76	45	66	60	62	55	...	...	...	SE	NW	SW	107

METEOROLOGICAL OBSERVATIONS FOR

Days of the Month.....	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....	Maximum....	Minimum....	Solar.....	Terrestrial....	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....
28	70	91	78	79⅔	92	..	69	..	25.140	25.040	25.040	25.073
29	68	85	71	74⅔	90	57	66	..	25.090	25.065	25.040	25.065
30	71	81	70	74	92	60	60	..	25.040	24.990	25.040	25.023
31	66	80	70	72	81	63	64	..	25.140	25.040	25.040	25.073
Sums..									.....	.....	.....	.....
Means.	67.2	82.5	68.7	72.81	87.2	54.6	65.3	11.7	25.084	25.054	25.087	25.075

THE MONTH OF JULY, 1888.—*Concluded.*

Days of the Month.....	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATURE OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m.....	2 p. m.....	9 p. m.....	7 a. m.....	2 p. m.....	9 p. m.....	Beginning.....	Ending.....	Inches rain, melted snow.	7 a. m.....	2 p. m.....	9 p. m.....	Daily movement, miles.
28	52	25	56	51	50	61	...	...	...	SE	SE	NW	118
29	63	36	52	55	55	53	...	...	...	NW	NW	W	106
30	77	58	60	63	65	55	...	...	...	NW	NW	NW	73
31	61	44	60	52	56	55	...	...	...	SW	SE	W	136
Sums..	....	....	....	....	....	.	..	..	..	..	...	...	...
Means.	65.1	43.4	58.7	54.5	56.5	52.7	...	..	0.60	...	...	...	2790
Av'ge..	....	55.77	....	....	54.58	..	...	.	...	...	...	...	...

METEOROLOGICAL OBSERVATIONS FOR

Day of the Month	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m.	2 p. m.	9 p. m.	Mean	Maximum	Minimum	Solar	Terrestrial	7 a. m.	2 p. m.	9 p. m.	Mean
1	70	80	65	71⅔	85	59	67	..	25.040	24.990	25.040	25.023
2	68	81	64	71	83	57	75	..	25.040	25.040	25.090	25.057
3	62	80	63	68⅓	84	52	64	..	25.090	25.040	25.065	25.065
4	58	77	60	65	88	49	..	..	25.040	24.940	24.940	24.973
5	62	83	66	79⅓	86	50	62	..	24.965	24.895	24.990	24.950
6	58	82	63	67⅔	85	53	65	..	25.040	24.890	25.040	24.990
7	54	73	61	62⅔	77	44	72	..	25.090	24.990	24.990	25.023
8	52	70	58	60	73	46	70	..	25.240	25.090	25.090	25.140
9	56	82	68	68⅔	85	46	65	..	24.990	24.940	24.990	24.973
10	58	80	68	68⅔	82	52	70	..	25.040	25.040	25.140	25.073
11	58	76	65	66⅓	78	60	70	..	25.240	25.215	25.265	25.240
12	65	80	72	72⅓	83	56	65	..	25.298	25.190	25.165	25.215
13	63	62	67	64	88	60	..	..	25.115	25.040	25.140	25.098
14	56	80	57	64⅓	84	55	62	..	24.990	24.940	25.040	24.990
15	58	69	68	65	72	58	68	..	24.985	24.990	25.115	25.030
16	55	63	62	60	68	55	42	..	25.140	25.140	25.190	25.157
17	60	70	59	63	72	58	77	..	25.210	25.040	25.140	25.130
18	62	80	58	66⅔	83	50	66	..	25.140	25.090	25.090	25.107
19	63	79	64	68⅔	80	55	68	22	25.140	25.100	25.190	25.143
20	58	77	58	64⅓	81	47	61	12	25.215	25.140	25.190	25.182
21	59	75	55	63	77	47	68	13	25.190	25.140	25.190	25.173
22	56	75	63	64⅔	80	48	59	13	25.215	25.215	25.240	25.223
23	55	80	59	64⅔	85	45	54	13	25.190	25.140	25.140	25.157
24	57	84	67	69⅓	86	46	66	13	25.120	25.090	25.090	25.100
25	62	83	62	69	88	51	55	18	25.090	25.040	25.040	25.057
26	58	82	62	67⅓	83	48	56	17	25.140	25.090	25.140	25.123
27	59	78	61	66	81	51	58	17	25.040	25.140	25.190	25.123

THE MONTH OF AUGUST, 1888.

Day of the Month.....	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATURE OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m.....	2 p. m.....	9 p. m.....	7 a. m.....	2 p. m.....	9 p. m.....	Beginning.....	Ending.....	Inches rain, melted snow.	7 a. m.....	2 p. m.....	9 p. m.....	Daily movement, miles...
1	64	47	65	57	58	53	...	...	...	S	SW	W	109
2	63	44	70	55	57	54	...	...	0.15	...	SW	W	130
3	64	35	60	50	50	49	...	...	...	E	W	NW	94
4	67	49	63	47	56	47	...	...	T.	W	W	S	107
5	64	29	36	50	47	38	...	...	...	NW	W	NW	107
6	78	39	55	51	55	47	...	...	...	E	NW	W	160
7	76	39	63	46	46	48	...	...	...	...	SE	W	217
8	57	90	72	37	67	49	...	...	...	SW	W	W	136
9	77	39	46	49	55	46	...	...	...	...	...	SW	87
10	72	41	63	49	54	55	...	...	...	NW	E	NW	97
11	83	55	65	53	59	53	...	...	...	SE	SW	NE	104
12	75	44	42	57	56	47	...	...	...	SE	NW	NE	93
13	60	84	66	49	57	55	2 pm	3.15 pm	0.25	...	SW	SW	...
14	88	44	83	53	56	52	...	...	...	...	SE	NW	94
15	83	59	85	53	54	63	7 am	10.30 am	0.16	W	NW	W	120
16	88	79	79	52	56	55	6 pm	10 am	0.45	W	NW	W	62
17	73	64	78	51	57	52	...	...	...	...	...	W	43
18	79	44	78	55	56	51	...	...	...	SE	SE	SW	58
19	55	31	56	47	46	48	...	...	...	NE	W	...	127
20	67	45	50	47	54	42	...	...	...	NW	SW	NW	80
21	72	34	76	50	44	48	...	...	...	SW	SE	...	85
22	65	40	74	44	49	55	...	...	...	W	SW	SW	90
23	76	54	62	48	62	46	...	...	...	SW	S	W	50
24	66	27	62	46	46	54	...	...	...	SE	...	N	52
25	54	31	64	45	50	50	...	...	...	E	SE	...	100
26	67	36	54	47	53	45	...	...	...	W	S	...	78
27	62	43	58	46	53	46	...	...	...	...	SE	SE	65

METEOROLOGICAL OBSERVATIONS FOR

Day of the Month.....	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m.....	2 p. m	9 p. m.....	Mean.....	Maximum	Minimum.....	Solar.....	Terrestrial..	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....
28	58	72	63	64⅓	78	52	71	16	25.230	25.190	25.190	25.203
29	62	79	62	67⅔	82	51	61	16	25.140	25.080	25.090	25.103
30	65	82	65	70⅔	85	51	64	20	25.140	25.140	25.215	25.165
31	58	80	77	71⅔	83	51	55	20	25.240	25.140	25.140	25.173
Sums..	1845	2394	1962	2067	....	....	1856	210	.....	.....	.....	.....
Means.	59.5	77.2	63.3	66.68	81.5	51.7	64	..	25.122	25.069	25.115	25.102

THE MONTH OF AUGUST, 1888.—*Concluded.*

Day of the Month	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATURE OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.	Beginning	Ending	Inches rain, melted snow	7 a. m.	2 p. m.	9 p. m.	Daily movement, miles
28	89	61	74	55	58	55	...	...	...	W	NW	SW	93
29	69	43	59	52	55	48	...	...	...	...	SE	SW	54
30	56	31	65	49	48	53	...	...	...	W	SW	NE	57
31	72	41	56	49	54	60	...	...	...	NE	S	NW	106
Sums..	....	....	....	....	....	..	...	...	...	...	...	...	...
Mean..	70.3	46.5	63.8	49.6	53.8	50.5	...	...	...	...	...	...	2855
Av'ge..	....	60.22	....	....	51.29	..	...	..	1.01	...	...	...	...

METEOROLOGICAL OBSERVATIONS FOR

Day of the Month.	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m.	2 p. m.	9 p. m.	Mean	Maximum	Minimum	Solar	Terrestrial	7 a. m.	2 p. m.	9 p. m.	Mean
1	57	75	55	62⅓	80	47	68	..	25.240	25.190	25.240	25.223
2	57	76	57	63⅓	78	49	58	..	25.200	25.140	25.140	25.160
3	57	80	59	65⅓	83	44	60	..	25.165	25.140	25.190	25.165
4	54	82	58	64⅔	83	45	55	..	25.220	25.125	25.140	25.162
5	53	78	68	66⅓	80	45	70	..	25.065	24.985	25.040	25.030
6	60	79	63	67⅓	82	48	65	..	25.079	24.993	25.080	25.051
7	55	79	56	63⅓	81	47	57	14	25.206	25.129	25.199	25.178
8	52	85	57	64⅔	89	43	53	14	25.176	25.135	25.153	25.155
9	53	89	68	70	81	44	64	16	25.083	24.942	24.934	24.986
10	57	79	67	67⅔	80	50	75	15	24.971	24.952	25.040	24.988
11	52	63	52	56	70	47	63	12	25.232	25.186	25.154	25.191
12	51	80	64	65	83	44	74	12	25.176	25.047	25.077	25.100
13	53	84	67	68	85	45	57	11	25.032	24.932	24.937	24.967
14	55	69	49	57⅔	72	53	56	14	25.238	25.121	25.209	25.189
15	50	80	50	60	83	41	54	15	25.237	25.140	25.195	25.191
16	51	75	57	61	80	37	55	12	25.151	25.036	25.195	25.127
17	48	70	59	59	72	38	62	10	25.034	24.940	24.951	24.975
18	48	79	56	61	82	44	66	11	24.936	24.867	24.949	24.917
19	53	71	56	60	74	45	80	9	25.022	25.031	25.157	25.070
20	51	72	53	58⅔	75	41	56	10	25.204	25.118	25.130	25.151
21	49	82	58	63	87	39	51	9	25.110	25.019	25.082	25.070
22	40	77	56	60⅔	80	40	54	..	25.135	25.080	25.165	25.127
23	48	74	55	59	77	43	56	10	25.183	25.110	25.168	25.154
24	62	72	55	63	76	50	56	11	25.325	25.324	25.325	25.325
25	46	76	53	58⅓	80	43	54	12	25.302	25.101	25.061	25.155
26	48	72	53	57⅓	75	40	57	11	25.123	25.163	25.196	25.161
27	40	64	45	49⅔	68	32	56	9	25.250	25.177	25.188	25.205

THE MONTH OF SEPTEMBER, 1888.

Day of the Month.....	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATURE OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m.....	2 p. m.....	9 p. m.....	7 a. m.....	2 p. m.....	9 p. m.....	Beginning.....	Ending.....	Inches rain, melted snow...	7 a. m.....	2 p. m.....	9 p. m.....	Daily movement, miles...
1	77	40	88	50	49	52	2 pm	7.30 pm	.12	...	NW	NW	98
2	71	45	71	48	53	48	...	...	...	NE	SE	NW	87
3	66	38	62	46	52	46	...	...	...	E	...	SW	68
4	70	20	61	44	37	45	...	...	...	E	...	SW	97
5	63	39	63	41	51	55	2 pm	3 pm	.02	...	SW	N	179
6	78	47	74	53	57	55	...	...	...	W	SW	NW	55
7	70	53	71	46	61	47	...	...	...	W	SW	NW	99
8	81	33	61	46	53	44	...	...	...	W	NW	N	100
9	70	38	58	43	60	53	...	...	...	...	S	...	68
10	71	43	49	48	55	47	...	...	...	...	NE	NE	50
11	75	60	81	45	49	46	...	...	...	NW	SW	W	101
12	74	44	56	43	56	48	...	...	...	W	SW	...	123
13	81	35	53	47	53	50	12 m 3.15 pm	1 pm 3.30 pm	.03	...	SW	...	86
14	70	53	73	46	51	41	...	...	...	...	S	...	150
15	68	32	68	40	47	40	...	...	...	...	NE	NE	74
16	56	31	61	36	42	44	...	...	...	NW	SE	S	98
17	60	52	62	35	51	46	...	...	...	NW	NE	W	87
18	86	37	88	44	51	53	3.30 pm	4.30 pm	.02	...	SW	...	75
19	87	48	88	49	51	53	5 pm	9 pm	.10	W	SE	S	97
20	81	35	75	45	43	45	...	...	...	SW	SW	S	88
21	67	22	61	38	40	45	...	...	...	...	SW	W	94
22	73	32	77	41	45	49	...	...	...	W	SW	SE	68
23	79	43	81	42	50	46	...	...	...	SW	S	NW	92
24	54	35	70	45	43	46	...	...	...	NW	NE	...	126
25	66	35	58	35	46	38	...	...	...	N	S	NW	71
26	60	35	63	35	43	40	...	...	...	...	SE	N	87
27	68	60	71	30	50	36	...	...	...	NW	SE	S	75

METEOROLOGICAL OBSERVATIONS FOR

Days of the Month.....	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....	Maximum.....	Minimum.....	Solar.....	Terrestrial.	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....
28	44	75	48	55⅔	76	35	56	..	25.205	25.230	25.331	25.255
29	41	79	50	53⅔	73	36	57	12	25.352	25.253	25.247	25.284
30	41	79	60	60	83	36	57	12	25.171	25.012	24.994	25.059
.								..	.....	.....	.....	....
Sums..	1536	2286	1703	1842	2368	1291	1802	261	.....	.....	.....	.....
Means.	51.2	76.2	56.8	61.40	78.9	43	60	10.9	25.161	25.087	25.129	25.126

THE MONTH OF SEPTEMBER, 1888.—*Concluded.*

Days of the Month.....	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATURE OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m....	2 p. m....	9 p. m....	7 a. m....	2 p. m....	9 p. m....	Beginning.....	Ending.....	Inches rain, melted snow.	7 a. m....	2 p. m....	9 p. m....	Daily movement, miles..
28	63	31	66	32	42	37	...	...	...	N	NE	NW	80
29	68	40	68	31	45	40	...	...	...	...	SE	NW	92
30	76	62	48	34	51	40	...	...	...	SW	S	NE	73
	....												
Sums..	....	....	....	....	..								....
Mean..	71.0	40.6	67.5	42.0	49.2	45.8	...	...	0.29	...	...	...	2538
Av'ge..	....	59.73	....	....	45.67	..							....

METEOROLOGICAL OBSERVATIONS FOR

Day of the Month.....	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....	Maximum....	Minimum....	Solar.....	Terrestrial...	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....
1	56	72	46	58	74	58	73	24	25.106	25.073	25.129	25.103
2	41	67	60	56	68	38	59	13	25.131	24.988	24.938	25.019
3	47	70	52	56⅓	75	46	57	14	24.901	24.848	24.966	24.905
4	51	64	55	56⅔	67	51	63	..	24.926	24.928	24.980	24.945
5	45	51	45	47	56	44	76	5	25.099	25.083	25.119	25.100⅓
6	43	52	45	46⅔	55	42	66	5	25.147	25.090	25.049	25.095
7	37	63	47	49	67	35	66	14	25.096	25.057	25.055	25.069
8	42	69	52	54⅓	72	36	55	10	25.062	24.982	24.962	25.002
9	47	71	53	57	73	43	57	14	25.025	24.970	25.070	25.002
10	40	59	48	49	63	37	66	12	25.175	25.114	25.115	25.135
11	41	65	51	52⅓	68	38	63	11	25.104	24.994	25.171	25.090
12	42	58	42	47⅓	61	39	61	12	25.242	25.088	25.071	25.134
13	39	71	55	55	74	32	60	8	24.986	24.845	24.938	24.923
14	42	59	44	48⅓	61	41	59	16	25.121	24.994	24.980	25.032
15	35	68	46	49⅔	69	33	64	14	24.982	24.943	25.053	24.993
16	35	63	44.5	47½	66	29	63	9	25.021	24.955	24.935	24.970
17	40	71	54.5	55.2	73	35	63	11	24.870	24.749	24.801	24.807
18	52	53	34	46⅓	63	53	65	18	24.903	25.025	25.180	25.036
19	24	52.5	34	36.8	55	20	59	0	25.248	25.156	25.126	25.177
20	30	54	45	43	55	26	49.5	10	24.958	24.869	25.014	24.947
21	38	47.1	42	42.4	50	36	68	13	25.115	25.042	25.094	2 .084
22	31	53.5	43.5	42⅔	56	29	59.5	10	25.050	24.947	24.986	24.994
23	39.5	62	48.5	50	65	29	67	14.5	24.935	24.808	24.805	24.849
24	55.5	62.5	50	56	64	43	47	15	24.734	24.691	24.740	24.722
25	38.5	46.5	34.5	39.8	51	38	59	13	24.755	24.703	24.723	24.727
26	31	51.5	42.5	41⅔	55	27	64	13	24.680	24.687	24.883	24.750
27	31	47	34	37⅓	49	20	63	11	25.052	25.045	25.088	25.062

THE MONTH OF OCTOBER, 1888.

Day of the Month.....	RELATIVE HUMIDITY OR PER CENT. OF SATURATION.			TEMPERATURE OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m.....	2 p. m ...	9 p. m.....	7 a. m.....	2 p. m.....	9 p. m.....	Beginning....	Ending	Inches rain, melted snow.	7 a. m	2 p. m.....	9 p. m.....	Daily movement, miles...
1	55	28	72	40	37	37	...	...	...	N	NE	NW	119
2	68	45	63	31	45	47	5 pm	...	T.	NE	SE	W	95
3	79	36	100	41	42	52	8 pm	12 pm	0.51	...	SE	SW	82
4	81	56	76	45	48	48	3 pm	...	...	SW	S	NW	151
5	89	69	85	42	41	41	...	3 am	0.30	W	N	N	158
6	85	75	71	39	44	36	Night of 5th		.07	SE	SE	SE	105
7	82	51	86	32	44	43	...	...	...	S	E	...	54
8	61	39	75	29	43	44	...	...	...	...	S	NE	68
9	72	27	41	39	35	30	...	...	...	W	W	W	121
10	68	47	79	30	39	42	...	...	...	W	S	SW	156
11	76	44	62	34	42	38	...	...	...	W	SE	SW	84
12	77	46	47	35	37	23	...	...	...	SE	S	SW	118
13	67	45	65	29	48	43	...	...	...	W	SE	N	81
14	77	43	49	35	36	26	...	...	...	S	SW	SW	233
15	64	31	66	24	36	35	...	...	...	W	SE	SE	130
16	64	38	59.5	24	37	30.5	...	...	...	W	S	...	88
17	59	45	50.5	27	48	36.5	...	...	...	W	S	SE	61
18	57	58	53	37	38	19	...	...	...	NW	E	SE	195
19	62	43.5	63	13	30.5	23	...	...	...	W	SE	W	100
20	48	53	50	13	37	27	...	...	...	W	S	N	95
21	50	34.5	47	21	21	23	...	...	...	N	E	SE	136
22	90	49.5	38.5	28	35	20	...	...	...	SE	SW	W	70
23	47.5	41	49	21	38	30	...	...	...	...	NW	NW	128
24	41	39.5	43	32	37.5	28	...	...	...	W	E	N	190
25	46.5	51.5	58.5	19.5	29.5	21.5	...	...	...	SW	S	SE	132
26	59	25.5	23	19	17	7.5	...	...	...	SW	W	NW	174
27	59	40	44	19	24	14	...	...	...	SW	SE	SW	322

METEOROLOGICAL OBSERVATIONS FOR

Day of the Month.....	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m..	2 p. m...	9 p. m....	Mean	Maximum....	Minimum	Solar	Terrestrial.	7 a. m..	2 p. m..	9 p. m	Mean .....
28	32	71	45	49⅓	73	24	52.5	9	25.078	25.066	24 .77	25 .07
29	39	71	44	51⅓	75	38	51	8	25.188	25 .12	24 .949	25 .09
30	39	67	51	52⅓	74	34	33	13	25.012	24 .984	24 .9	24 .977
31	36.5	68	47	50½	70	35	51	11.5	24.888	24.769	24 .75	24 .80
Sums..	1240	1899	1435	1524.9	1997	1129	..	..	.....	.....	.....	.....
Means.	40.0	61.3	46.3	49.19	64.4	36.4	61.9	11.7	25.019	24.952	24 .901	24 .98

THE MONTH OF OCTOBER, 1888.—*Concluded.*

Day of the Month	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATU E OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.	Beginning	Ending	Inches rain, melted snow.	7 a. m.	2 p. m.	9 p. m.	Daily movement, miles.
28	70	48	67	23	51	34	...	...	...	W	SW	...	111
29	72	34	56	30	41	29	...	...	...	SW	S	SW	80
30	81	33	50	22	37	33	...	...	...	SW	W	W	70
31	64	31	52	25	36	30	...	...	...	SW	S	SE	103
Sums	....	....	....	....	....	....	....	....	....	....	....	....	....
Mean	05.84	43.45	59.39	29	37.9	32	...	...	...	...	...	...	...
Av'ge	....	56.23	....	....	32.94	....	....	...	0.88	...	...	...	3810

METEOROLOGICAL OBSERVATIONS FOR

Day of the Month.....	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....	Maximum.....	Minimum.....	Solar.....	Terrestrial.....	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....
1	52.5	48.5	34	45	60	42	43.5	12.6	24.789	24.866	24.957	24.871
2	28.5	51	37	42.2	64	29	57	9	25.057	25.067	25.091	25.072
3	27	55.5	43.5	42	58	27	52.5	9	24.990	24.845	24.817	14.884
4	34	43	39	38⅔	45	35	41	12.5	24.974	24.800	24.754	24.843
5	28	42	29	33	44	29	64.5	10	24.977	24.983	25.081	25.014
6	22.5	38.2	31.5	30.7	40	32	57	22	25.000	24.835	24.811	24.882
7	32	33	27	30⅔	37	31	60	10	24.993	25.056	25.133	25.040
8	19	41	27	29	....	16	103*	10	25.193	25.118	25.134	25.148
9	17.5	54	27	32.8	....	..	117*	*7	25.060	25.031	25.113	25.068
10	17	50.5	26	31.2	....	..	110	8	25.174	25.092	25.067	25.111
11	23	57	24.5	34.8	....	..	122	14	24.987	24.827	24.969	24.928
12	18	57	24.5	33.2	....	..	144	9	24.940	24.868	24.896	24.901
13	20	50.5	34	38.2	....	..	120	8	24.887	24.859	24.973	24.906
14	20	40	32	30⅔	....	..	92	11	25.063	24.917	24.937	24.972
15	21	21.5	22	21⅔	....	..	70	14	25.085	25.054	25.061	25.067
16	14	34	27	25⅓	....	..	83	7	25.137	25.039	24.983	25.053
17	23	36.5	24	27.8	....	..	91*	16*	24.900	24.884	25.143	24.976
18	22	56.5	41	39.8	57	19	57	7	24.969	24.966	25.165	25.033
19	22	17	21.5	30.2	17.5	22	55.5	5	25.231	25.204	25.303	25.287
20	15.5	51.5	25	30⅔	53	13	55	5	25.248	25.172	25.184	25.201
21	15.5	51	27	31.2	52	15.5	57	9.5	25.151	25.066	25.075	25.097
22	21	52.5	24	32.5	54	20	56	11	25.063	25.003	25.018	25.028
23	20	52.5	22.5	31⅔	53.5	21	57.5	11	25.027	25.016	25.011	25.018
24	17	53	27	32⅓	54	16.5	53	7.5	25.216	25.178	25.192	25.295
25	18	47	29.5	31½	50	18	64	11	25.146	25.020	24.962	25.043
26	31.5	48	41	40.2	49	26	70	8	24.906	24.862	24.928	24.890
27	31	35	32	33⅔	35	33	16.5	1	25.038	24.072	25.152	25.087

*The numbers under Solar Radiation from the 8th, and terrestrial radiation from the 9th to the 17th inclusive, are the readings of the instruments and not the difference between those readings and the registering thermometer.

THE MONTH OF NOVEMBER, 1888.

Day of the Month	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATURE OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.	Beginning	Ending	Inches rain, melted snow	7 a. m.	2 p. m.	9 p. m.	Daily movement, miles
1	27	83	81	19	43	29	1 pm	4 pm	.03	NW	S	SE	175
2	100	40	65	28.5	36	26	...	...	...	SW	S	SW	112
3	100	41	58	27	32	29	...	...	...	...	S	W	116
4	81	62	96	29	31	38	2 pm	Morning	.23	S	SE	NW	125
5	100	58	100	28	27	29	...	...	...	S	SE	...	196
6	93	48	90	21	20	28	...	...	...	...	SE	SW	94
7	70	71	77	23	25	21	...	...	...	N	NE	SW	170
8	71	31	77	11	13	21	...	...	...	NW	NW	SW	283
9	92	37	100	16	28	27	...	...	...	SE	S	SW	156
10	84	24	88	13	15	23	...	...	...	NW	SE	SW	110
11	80	12	94	18	5	22.0	...	...	...	NW	SE	SW	123
12	85	21	81.5	14	18	19.5	...	...	...	...	S	SW	82
13	86	19.5	63	16	18.5	23	...	...	...	W	S	SW	75
14	100	59	70	20	27	23	...	...	...	W	W	NE	101
15	86	93	93.5	18	19.5	21.5	...	...	...	SE	SE	SE	127
16	100	54	89	14	20	24	...	...	...	...	SE	N	88
17	80	60	75	18	23	17	...	...	...	E	...	S	104
18	93	25	68	20	21	31	...	...	...	NW	S	NW	71
19	100	28	79	22	15	16	...	...	...	W	SE	SE	126
20	100	25	88	15.5	17	22	...	...	...	W	SW	...	93
21	91	28	83	13	19	22	...	...	...	...	...	SE	73
22	93	25	62	19	17	13	...	...	...	W	SW	SW	98
23	93	14	86	18	5	19	...	...	...	W	SE	W	112
24	92	15	60	15	7	15	...	...	...	W	S	SW	69
25	85	34	89	14	20	26	...	...	...	W	SE	...	60
26	90	53	64	28	32	29	...	...	...	W	NE	NE	81
27	95	77	100	32	28	32	All day		.06	NW	NE	...	144

METEOROLOGICAL OBSERVATIONS FOR

Day of the Month.....	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....	Maximum.....	Minimum.....	Solar.....	Terrestrial.....	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....
28	31	38	29.5	32.8	37	30	21	½	25.200	25.184	25.236	23.207
29	28	37	28.5	31.2	39	28	65	2	25.166	26.078	25.070	25.107
30	15	41.5	23.5	26⅔	43	15	59	9	25.032	24.984	24.904	25.003
..	....	....	....	....	....	....	.....	....	.....	.....	.....	.....
Sums..	707.	1384	881.	991.3	....	....	....	....	.....	.....	.....	.....
ans.	23.5	46.1	29.3	33.04	48.6	24.7	53.7	8.8	25.052	25.000	25.042	25.031

THE MONTH OF NOVEMBER, 1888.—*Concluded.*

Days of the Month	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATURE OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m.	*2 p. m.*	*9 p. m.*	*7 a. m.*	*2 p. m.*	*9 p. m.*	*Beginning*	*Ending*	*Inches rain, melted snow*	*7 a. m.*	*2 p. m.*	*9 p. m.*	*Daily movement, miles*
28	90	57	100	28	24	29.5	n'ht	no'n	.06	NE	E	...	76
29	100	56	100	28	23	28.5	...	...	.06	...	SW	SW	75
30	100	35	87	15	16	20	...	...	...	...	SW	SW	69
..	....	....	....	....	....	..	...	...	...	...	...	...	....
Sums..	....	....	....	....	....	..	...	...	...	..	...	...	....
Mean..	88.6	42.8	82.1	20	21.5	24.2	...	...	0.38	...	...	...	3384
Av'ge..	....	71.17	....	....	25.68	..	...	...	..	...	...	...	....

METEOROLOGICAL OBSERVATIONS FOR

Day of the Month.....	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....	Maximum.....	Minimum.....	Solar.....	Terrestrial.....	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....
1	10.5	46	42	32.8	48	11	61	9	24.888	24.833	24.857	24.859
2	32.5	42	22	32.2	43	32.5	66	2	25.097	25.166	25.270	25.178
3	14.5	52	30.5	32.3	54	12.5	54	7.5	25.256	25.224	25.194	25.225
4	48	66.5	38.5	51	68	26	54	11	25.154	25.080	25.136	25.123
5	18.5	55	24	32.5	57	19	56	12	25.195	25.071	24.993	25.086
6	23.5	51	30	34.5	53	18	41	11.5	24.911	24.910	24.885	24.902
7	29	51	20.5	33.5	52.5	27	55	11.5	24.910	24.922	24.994	24.942
8	15	50	26	30.3	51	15	56.5	14	24.934	25.018	25.009	24.987
9	32	56.5	29.5	39.2	58	18	6.6	9	24.921	24.900	24.966	24.929
10	22.5	45.5	31	33	49.5	19	51.5	10	25.046	24.995	24.918	24.986
11	23	51.5	30	34.8	53	20	53	11	24.916	24.909	25.018	24.948
12	16	54.5	34.5	35	60	18	51	11	25.020	24.994	25.034	25.016
13	19	54.5	25	32.8	57.5	18	54.5	11	25.001	24.873	24.848	24.907
14	20	44	39	34.3	48.5	21	50.5	7.5	24.740	24.506	24.589	24.612
15	31.5	49.5	38.5	39.8	50	32	61.5	12	24.677	24.682	24.832	24.730
16	29	46.5	32	36.5	48	27.5	57	8.5	24.926	24.889	24.904	24.906
17	40	41	26	35.7	47	26	57	11	25.032	25.168	25.247	25.149
18	17	43	21.5	27.2	46	15.5	59.5	9.5	25.232	25.188	25.219	25.213
19	14.3	54.5	29	32.6	56	13	54.5	7.5	25.193	25.092	25.088	25.124
20	20.5	55.4	28	34.6	57	22	59.1	15.5	25.196	25.093	25.142	24.144
21	25	55.6	20.3	33.6	58	23	44	9.5	25.082	24.955	24.935	34.991
22	22.6	58.8	35.5	39	63	18	59.4	11.2	24.798	24.690	24.673	24.720
23	24	51.5	33	36.2	52	23	30	9	24.640	24.629	24.695	24.665
24	23.5	34.9	24.8	27.7	37.5	19	65.5	9	24.744	24.794	24.923	24.820
25	19.5	52.5	20	20.7	23	19	53.5	8.5	24.987	24.993	24.928	24.969
26	12	31	11	18	33	11	67	11	24.536	24.816	24.901	24.751
27	4	29.5	15.9	16.5	31	4	81	13.5	24.820	24.954	25.057	24.944

THE MONTH OF DECEMBER, 1888.

Day of the Month	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATURE OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.	Beginning	Ending	Inches rain, melted snow	7 a. m.	2 p. m.	9 p. m.	Daily movement, miles
1	90	26	29	9	13	12	...	...	...	...	SW	W	83
2	90	40	100	29	19	22	...	...	...	NW	N	...	246
3	91	19	44	12	11	10	...	...	...	W	S	S	123
4	23	16	34	12	24	12	...	...	...	NW	W	E	215
5	70	14	56	10	6	10	...	...	...	W	SE	...	174
6	74	28	48	16	19	13	...	...	...	NW	W	SW	87
7	78	22	65	23	14	10	...	...	...	W	...	SW	64
8	83	16	53	11	5	11	...	...	...	...	S	SW	84
9	80	9	68	27	-2	20.5	...	...	...	S	SW	W	85
10	55	32	59	8	17	19	...	...	...	NE	SE	SW	110
11	87	21	79	20	12	24	...	...	...	SW	SE	W	108
12	84	28	67.5	12	21	24.5	...	...	...	NW	...	W	116
13	85	28	100	15	22	25	...	...	...	NW	...	SW	90
14	65	43	100	9	23	29	...	...	...	NW	W	NE	84
15	84	31	39	27	20	15	5 pm	8 pm	.03	...	NW	NW	193
16	57	21	80	16	8	27	...	...	...	NW	SE	SE	410
17	59	38	47	27	17	8	...	...	...	NW	NW	...	197
18	84	28	46	13	12	4	...	...	...	NW	S	NW	209
19	100	30	100	14.3	24	29	...	...	...	W	SE	...	98
20	79	28	100	15	23	28	...	...	...	NW	SE	NW	100
21	73	33	94	17	27	19	...	...	...	...	...	NW	88
22	86.5	20.5	54	19.5	18	21	...	...	...	NW	SW	NW	56
23	75	48	85	17	32	29	...	...	...	NW	N	NW	94
24	90	68	100	21	25	24.8	8 pm	...	...	NW	NE	SE	131
25	93	80	93	18	18	18	...	8 am	0.13	SE	SE	...	146
26	81	69	62	7	22	0	...	...	...	SE	E	W	80
27	31	48	94	-20	12	14	...	...	...	...	S	...	105

METEOROLOGICAL OBSERVATIONS FOR

Days of the Month.....	TEMPERATURE OF THE AIR IN SHADE.				REGISTERING THERMOMETER.		RADIATION.		BAROMETER.			
	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....	Maximum.....	Minimum.....	Solar.....	Terrestrial.....	7 a. m.....	2 p. m.....	9 p. m.....	Mean.....
28	4.5	38.5	17.5	20.2	41	4	55	11	25.011	25.026	25.096	25.044
29	11	38.5	17.5	22.3	40	9	58	9.5	25.134	25.083	25.093	25.103
30	5.5	38	21.5	21.7	40	6	59	10	25.158	25.211	25.348	25.239
31	5.5	39.5	13.5	19.5	42	5	57	8	25.409	25.319	25.293	25.340
Sums..	633.	1448	829.	970.	....	....	....	....	774.564	773.983	775.985	774.542
Means.	20.4	46.7	26.7	31.30	48.95	17.81	56.4	10.1	24.988	24.967	25.003	24.985

THE MONTH OF DECEMBER, 1888.—*Concluded.*

Day of the Month	RELATIVE HUMIDITY OR PER CENT OF SATURATION.			TEMPERATURE OF DEW POINT.			PRECIPITATION			WIND.			
	7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.	Beginning	Ending	Inches rain, melted snow	7 a. m.	2 p. m.	9 p. m.	Daily movement, miles.
28	100	47	76	4.5	19	12	...	...	...	SE	...	NE	56
29	81	31	92	6	10	16	...	...	...	...	...	...	42
30	88	30	60	3	9	10	...	...	...	SW	N	NW	106
31	88	36	56	3	15	3	...	...	...	...	...	NW	102
Sums..	....	....	....	....	....	..	...	...	...	...	...	...	...
Mean..	77.9	33.2	70.3	13.6	16.6	16.8	...	...	0.16	...	...	...	3882
Av'ge..	....	60.47	....	....	15.66	..	...	...	...	...	...	...	...

ABSTRACT FOR THE YEAR.

Months	Mean Barometer	Temperature of air in shade: Mean	Highest	Lowest	Mean temperature of dew point	Mean relative humidity	Total movement of wind, miles	Inches rain and melted snow	Evaporation, inches.	Sunshine, per cent.
January	24.818	22.2	71	.28	2.82	44.60	2985	0.29	....	71.5
February	24.793	37.1	68	12	24.52	61.46	5224	0.36	....	.....
March	24.805	37.4	79	3	21.77	59.74	4039	0.73	....	79.1
April	24.944	55.3	87	30	42.00	62.60	*5535	1.23	....	.....
May	24.835	54.4	84	30	40.16	62.16	4200	3.39	4.45	.....
June	24.827	68.1	97	42	48.36	52.48	*4400	0.47	7.70	.....
July	25.075	72.8	99	51	54.58	55.77	*3090	0.60	7.00	69.2
August	25.102	66.6	88	44	51.29	60.22	*2950	1.01	4.65	71.6
September	25.126	61.4	89	32	45.67	59.73	2538	0.29	3.35	83.2
October	24.98	49.2	75	20	32.94	56.23	3810	0.88	2.17	63.9
November	25.031	33.0	64	13	25.68	71.17	3384	0.38	1.35	60.0
December	24.985	31.3	68	.4	15.66	60.47	3882	0.16	.99	68.8
Year	24.944	49.01	..	....	33.79	58.88	46037	9.79	....	.....

SUNSHINE.

The sunshine for the eight months of 1888, of which we have record, bears out Colorado's claim to a sunny climate. For compareson we put side by side the record from the New York Experiment Station in Central New York and our own:

Month.	New York.	Colorado.
January	14.5	71.5
March	29.7	79.1
July	57.9	69.2
August	56	71.6
September	55	83.2
October	41.8	63.9
November	34.8	60
December	24.2	68.8
Year	39.2	71

That given in the New York record is not the average, but the greatest amount of sunshine in the given month their record shows.

Our location being within a few miles of the foothills, their shadow shortens our afternoons. Estimating their average elevation at 3°, our day is shortened by from 18½ to 21 minutes, according to the declination of the sun. This correction has been taken into account in finding the possible amount of sunshine. It will be noticed that the recorded amount of sunshine on one or two days in October and November exceeds the possible amount by several minutes. The records of these days has been looked on with some doubt, but a careful scrutiny and repeated measurements seem to render it probable that the number given is correct within 5 minutes. The amount observed is, however, less than the amount that would be received were the mountains absent.

The record for July and August is taken from the self-registering Draper sun thermometer, and the amount of sunshine has wider limits of error than in the other months, which are recorded by Pickering's form of sunshine recorder.

SUNSHINE FOR 1888.

Day of Month	JANUARY.		MARCH.		JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.	
	Actual	Possible	Actual	Possible	Actual	Possible	Actual	Possible	Actual	Possible	Actual	Possible	Actual	Possible	Actual	Possible
1	.....	.....	5.30	10.53	7.30	14.53	10.30	13.54	8.00	12.44	5.50	11.27	6.25	10.05	8.35	9.07
2	.....	.....	.....	10.56	13.30	14.53	11.05	13.52	12.41	12.41	7.55	11.24	5.35	10.03	9.05	9.06
3	.....	.....	3.00	10.58	14.00	14.48	9.00	13.50	12.39	12.39	5.28	11.21	.....	10.00	4.35	9.05
4	....	.....	3.30	11.01	13.45	14.45	11.40	13.48	12.15	12.38	4.12	11.18	1.35	9.58	9.05	9.04
5	.....	.....	7.00	11.04	7.00	14.42	13.30	13.46	6.40	12.34	2.34	11.16	4.40	9.55	9.02	9.02
6	.....	.....	10.00	11.06	13.00	14.39	13.00	13.43	7.00	12.31	3.42	11.13	5.15	9.53	2.20	9.01
7	.....	.....	9.00	11.09	8.00	14.37	13.30	13.41	12.29	12.29	7.34	11.10	5.50	9 51	5.00	8.60
8	9.02	9.02	8.30	11.12	9.00	14.34	13.00	13.39	12.26	12.26	1.34	11.07	9.51	9.49	9.00	8.60
9	9.03	9.03	.....	11.15	13 30	14.31	13.15	13.37	11,50	12.24	11.30	11.05	5.25	9.47	8.40	8.59
10	9.04	9.04	11.00	11.17	14.30	14.30	10.35	13.35	8.15	12.21	7.50	11.02	9.42	9.45	4.50	8.59
11	9.06	9.06	11.20	11.20	14.45	14.28	11.00	13.33	4.30	12.19	4.15	11 00	9.40	9.42	4.20	8.58
12	9.08	9.08	11.23	11.23	14.00	14.27	9.00	13.31	12.16	12.16	8.49	10.57	10.00	9 40	9.00	8.57
13	9 09	9.09	11.25	11.25	13.30	14.26	9.20	13.28	5.40	12.13	9.00	10.55	4.55	9.38	8.00	8.57
14	9.11	9.11	11.28	11.28	3.30	14.25	7.05	13.26	12.11	12.11	10.45	10.52	1.35	9.36	4.20	8.56
15	9.12	9.12	10.40	11.31	10.00	14.23	3.25	13.24	12.08	12.08	10.12	10 50	2.30	9.34	8,10	8.56

16.....	9.14	9.14	3 30	11.33	11.30	14.22	1.40	13.22	12.06	12.06	10.23	10.47	1.65	9.32	5.45	8.55
17.....	8.10	9.16	10.30	11.36	3.00	14.21	1.35	13.20	7.35	12.03	1.11	10.45	5.15	9.30	5.05	8.55
18.....	9.17	9.17	10.00	11.39	12.20	14.19	3.50	13.18	5.40	12.00	2.42	10.42	8 45	9.28	7.55	8.55
19.....	8.10	9 19	11.00	11.42	14.00	14.18	4.30	13.16	2.40	11.58	10.50	10.40	9.25	9.27	9.00	8.54
20.....	9.00	9.20	4.00	11.44	7.00	14.16	7.55	13.13	11.55	11.55	1.34	10.37	9.23	9.25	6.20	8.54
21.....	9.22	9 22	10.00	11.47	6.00	14.15	5.10	13.11	11.53	11.53	8.45	10.34	9.21	9 23	7.00	8.54
22.....	1.30	9.24	6.00	11.50	5.00	14 13	9.50	13.08	11.50	11.50	9.00	10.31	8.30	9.21	4.25	8.54
23.....	9.00	9.26	12.00	11.52	4.00	14.11	13.06	13.06	11.35	11 48	7.05	10.29	9 05	9.19	.05	8.54
24	9.00	9.28	7.00	11.55	8 00	14.10	13.04	13.04	11.30	11.45	.45	10.26	8 55	9.18	3.20	8.53
25.....	8.00	9.30	3.00	11.58	11.00	14.08	12 30	13.01	11.43	11.43	4.40	10.23	4.25	9.16	.....	8.53
26	9.32	9.32	5.00	12.00	10.00	14.06	12.30	12.59	11.40	11.40	9.23	10 21	1.00	9.14	6.45	8.53
27.....	9.34	9 34	.30	12.03	11.30	14.04	9.20	12.56	11.38	11.38	7.15	10.18	.....	9.13	3.30	8.53
28.....	9.00	9.36	2.00	12.06	9.00	14.03	10.00	12.54	10.25	11.35	9.26	10.15	1.55	9.11	8.55	8 53
29	9.38	9.38	11.30	12 09	9.00	14.01	10.51	12.51	11.32	11.32	10.22	10.12	8 10	9.10	9.00	8.52
30.....	9.40	9.40	12.12	12.12	9 00	13.59	8.00	12.49	10.00	11.30	6.05	10.10	.....	9.09	9.05	8.52
31.. ...	9.42	9.42	11.40	12.14	9.00	13.57	12.00	12.46	.....	.....	4.30	10.07	.....	.....	.....	.....
Total	201.47	282.03	287.38	363.28	308.50	445.44	294.46	414.01	304.42	366.28	214.36	334.14	172.12	287.15	190.12	276.31
Percent. acual of possible..	.....	71.5	.....	79.1	.....	69.2	.....	71.6	.....	83.2	.....	63.9	.....	60.0	.....	68.8

SOIL TEMPERATURES.

Week Ending.	7 A. M.						2 P. M.						9 P. M.					
	Three inch	Six inch	One ft.	Two ft.	Three ft.	Six ft.	Three inch	Six inch	One ft.	Two ft.	Three ft.	Six ft.	Three inch	Six inch	One ft.	Two ft.	Three ft.	Six ft.
June 16	....	65.1	67.1	62.1	58.1	....	....	77	66.8	62.5	58.1	....	....	78	69.8	62.3	59.3	....
June 23	....	65.1	67.6	63.9	60	....	....	75.7	67.2	63.8	60.1	....	....	75.9	7[illegible].3	63.8	60.1	....
June 30	....	67.1	68.5	63.8	60.4	....	....	76	6[illegible].2	64.1	60.6	....	....	77.8	71.7	64.3	60.6	....
July 7	....	71.3	72.4	67.4	63.3	....	....	80	71.9	67.6	63.5	....	....	80.7	74.8	67.4	63.5	....
July 14	....	73.8	74.9	69.9	65.7	....	....	83.5	74.6	70.1	66	....	....	84.5	77.7	69.9	66	....
July 21	....	71.8	73.6	71.4	68.1	....	....	80	73.1	71.4	68 3	....	....	80.9	75.9	71	68.3	....
July 28	....	70.7	72.6	70.4	68	....	....	79.6	72.3	70.5	68	....	....	79.2	74.9	70.7	68.1	....
August 4	....	70.4	72.4	70.7	68.3	....	....	77.9	72.4	70.7	68.4	....	....	76.8	73.8	70.7	68.3	....
August 11	....	67.1	69.1	68.4	66.9	....	....	73.9	69.1	68.5	66.9	....	....	73.9	70.3	68.3	66.9	....
August 18	....	65.1	67.4	67.4	66.4	....	....	69.5	67.1	67.3	66.4	....	....	69	67.8	66.9	66.4	..
August 25	....	62.8	66	65 9	65.2	....	...	70.8	65.6	66.1	65.7	....	...	71 5	68 2	66	65.3	....
September 1	....	64.2	67.1	66.2	65	....	....	71.2	66.7	66.4	65.4	....	....	71.6	68.8	66.2	65	....
September 8	....	60.4	64.6	64.9	64.4	....	....	66.9	63.6	65.1	64.4	....	....	67.7	65.8	64.7	64.4	...
September 15	....	58.6	62.4	63.1	62.9	....	....	63.7	61.8	63.3	63.2	....	....	64.6	63.4	63	63.1	...

September 22	51.8	56.2	60.3	61.4	61.6	61.6	69.2	61.7	59.6	61.6	61.7	61.7	61	62.6	61.5	61.4	61.6	61.6
September 29	49.9	54.4	58.6	00	60.3	60.8	66.9	59.8	58.2	60.2	60.5	60.8	57.8	60.2	59.8	59.8	66.4	60.9
October 6	50.9	53.5	56.9	58.4	58.9	60.1	62.3	57.1	56.4	58.5	59	60.1	56.2	57.6	57.6	58.1	58.9	60
October 13	43.6	47.9	52.8	55.7	57	59.1	56.2	51.8	52	55.8	51	59.1	51.5	53.3	53.5	55.6	56.9	58.9
October 20	41	44.8	50.2	53.6	55.1	57.8	52.4	48.5	49.5	53.6	55.1	57.9	46.9	49.4	51.1	53.5	55	58.1
October 27	38.3	42.4	46.9	50.6	52.6	56.8	48.1	45.1	45.3	50.4	52.6	56.1	43.5	46.1	47.2	50.3	52.5	56.6
November 3	38.1	41.1	45.7	48.8	50.8	55.2	49.2	45.3	45.5	49.3	50.9	55.4	44.7	46.9	46.8	49	50.8	55.3
November 10	33.1	37	41.4	45.3	48.9	54.2	39	37.1	31.4	46.2	48.9	54.2	34.6	37.3	40.8	47.9	48.7	54.9
November 17	30.8	33.6	37.1	42.1	45.3	52.3	31.5	33.1	36.8	42	45.3	52.4	31.9	33.8	36.9	42	45.4	52.3
November 24	29.5	32.7	35.9	40.3	43.3	50.6	31.5	32.5	35.7	40.3	43.3	50.6	31.7	33.0	35.7	40.3	43.3	50.5
December 1	30.9	33.4	36.0	39.4	42.1	49.0	33.8	33.6	35.9	39.6	42.1	49.0	32.9	34.1	36	39.5	42	49
December 8	29.0	31.5	34.3	38.2	41.0	47.8	30.9	31.5	34.2	38.3	41.0	47.8	30.9	31.8	34.2	38.3	40.9	47.8
December 15	28.1	30.8	33.4	37.3	39.9	46.7	30.6	31.0	33.4	37.4	39.9	46.7	31.0	31.2	33.4	37.2	39.9	46.6
December 22	29.2	31.3	33.8	37.0	39.3	45.7	31.8	31.6	33.7	37.1	39.3	45.7	30.8	32.0	33.7	36.9	39.3	45.7
December 29	26.8	29.7	32.2	35.4	38.2	44.5	28.1	29.3	32.2	35.9	38.3	44.9	27.8	29.7	32.1	35.9	38.3	44.9

Report of the Veterinarian.

To the Executive Committee, State Board of Agriculture:

SIRS—I beg to submit my first annual report as Veterinarian to the Experiment Station of the State Agricultural College.

My services having only commenced on September 1 of this year, and there being no provision for this department as to buildings, etc., I have no report of experiments to make.

In order that I may as soon as possible commence work in my department, I beg to submit for your consideration the following outline of the work I propose to engage in, which has already been submitted to and approved by the Council of the Station.

In order to commence and carry on any experiments or observations of the diseases of animals, I think that it will be necessary to put up some suitable buildings, in some convenient part of the Station, which for this year might be temporary. They should, if possible, have good drainage, a plentiful supply of water and a good man in charge. As a site I would suggest that of the old barn as being comparatively isolated in cases of contagious diseases. I herewith attach a sketch of the style and number of buildings which I think should be put up this fall. The sketch is by Professor Lawrence, who estimates the cost at $1,000. I will also require various instruments, as thermometers, hypodermic syringes, a case of dissecting knives, a case of post mortem instruments, saws and other things suit-

able for operating on large and small animals, at an estimated cost of $60.

PROPOSED EXPERIMENTS.

First—The loco disease:

(*a*) Two or three horses affected with the disease to be placed in the stables and accurate daily observations of their symptoms and progress of the disease to be recorded. Treatment such as the apparent nature of the disease will suggest, to be attempted, and post mortem examinations to be made of animals which die of, or are killed as suffering from the disease.

(*b*) Two or three sheep, to be observed in the same manner.

(*c*) Two or three cattle, to be observed in the same manner.

(*d*) Two or three horses, cattle or sheep, as may be determined, to be fed for a definite period upon half a dozen of the supposed poisonous varieties of the loco plant, and daily observations to be taken and recorded, with the object of determining the virulence or innocence of the loco in the production of this disease.

Second—Tape worms in Sheep:

Inasmuch as tapeworms (*toenia expansa*) have been found in large numbers in the liver of sheep affected with the loco disease, I propose to get some sheep from the districts where they have been found so affected and make observations and post mortem examinations, and also to feed the tape worms and their larvæ, in order to determine the possible connection of the tapeworm with the cause of the so-called loco disease.

Third—I have been informed that in the neighborhood of Longmont and Loveland, a disease of an unknown nature affects horses, by which they lose their manes and tails, the hair falling out. It might be well to get one or two of these horses to observe and experiment with remedies to prevent this taking place.

Other experiments can be made, as cases of puzzling or unknown diseases arise throughout the State, a circular relating to which can be prepared, when we have buildings and apparatus to undertake the work.

In connection with this work I prepared the following circular, to be issued as part of the October bulletin, the object being to obtain statistics and as much information as possible concerning the disease in the State from those who are most interested in it, and who will be best able to give the information desired.

VETERINARY DEPARTMENT.

Experiments to determine the cause, nature, symptoms and post mortem appearances of the so-called loco disease in this state, are about to be commenced at the Experiment Station.

Answers to the following questions are requested from all who have suffered loss from this disease, and who have had personal experience of the affection.

First—When was the disease first observed to affect your animals, and at what season of the year?

Second—What symptoms are observed, and how long does the disease last, on an average?

Third—How many animals have you lost from the loco disease?

Fourth—How many animals have you now sick from the loco disease?

Fifth—What is your opinion as to the cause of the disease?

Waiting for instructions, I have the honor to be,

Your obedient servant,

WILLIAM McEACHRAN,

Veterinarian.

REPORT OF THE

ASSISTANT HORTICULTURIST

IN CHARGE OF THE APIARY.

To the Executive Committee in Charge:

SIRS—Through the Director, I have the honor to submit the following report of the Apiary for 1888:

The experiments conducted in the Apiary the past season are as follows:

First—The weekly increase in weight of one colony of bees.

Second—Natural vs. artificial swarming.

Third—Natural vs. artificial comb.

Fourth—Italianizing common bees.

Fifth—Bees fed with syrup containing arsenic.

On account of the poor season we had, the experiment, natural vs. artificial swarming, had to be omitted, but others were substituted in its place.

Our bees wintered in good condition, and as spring opened up very favorably they went to work in a way that bespoke large returns for the season. But after our fine weather in April came May with its frosty nights, which cut off all the usual bloom during that time of year. Only by steady feeding could we keep up the vigor of each colony, so that when our honey flow came they were strong for the amount of work expected of them. And we must add, that only by close

attention and liberal feeding whenever the honey crop is cut short, especially at the opening and closing of the season, may the apiarist expect a rich return for his bees. The greatest mistake of which bee-keepers are guilty is neglect in feeding at the proper time. A little syrup (3 parts of water to 2 of granulated sugar) given each day, two tablespoonfuls to each colony until the honey flow sets in, would double or treble the amount of surplus honey.

First—This past season we fed our bees until the 1st of June, when they commenced to gather a little honey. In order to determine the weekly gain of one colony, we placed a healty swarm on a pair of scales, and noted the weekly increase in weight every Saturday night with the following results:

Date.	Weight of Colony.	Gain per Week.	Average Gain per Day for Week.	Average Gain per Week for Season.	Average Gain per Day for Season.	Total Gain.
June 2	36	.....	....	....	....	.....
June 9	39	3	0.43	.....	.....	.....
June 16	45	6	0.86	.....	.....	.....
June 23	54	9	1.28	.....	.....	.....
June 30	62	8	1.14	.....	.....	
July 7	72	10	1.43	.....	.....	.....
July 14	80	8	1.14	.....	.....	.....
July 21	88½	8½	1.23	.....	.....	.....
July 28	98½	10½	1.50	.....	.....	.....
Aug. 4	108¾	10¼	1.46	.....	.....	.....
Aug. 11	130¼	21½	3.07	.....	.....	.....
Aug. 18	146	15¾	2.25	.....	.....	.....
Aug. 25	155½	9½	1.35	.....	.....	.....
Sept. 1	163¾	8½	1.18	.....	.....	.....
Sept. 8	170¾	7	1.00	.....	.....	.....
Sept. 15	176	5¼	0.75	.....	...	.....
Sept. 22	176½	½	0.07	.....	.....	.....
Sept. 29	175	.....	.....	8.81	1.26	141

In the foregoing table it will be readily seen that the bees did not commence to store honey until the first week of June; they did their best work during August, consequently we had no natural swarm issuing in season to go on with our experiment, natural vs. artificial swarming.

Second—Any apiarist that is up with the times, knows that artificial swarming is the only right way to increase and at the same time get the greatest possible yield of honey. For the new beginner and old fashioned bee-keeper, facts and figures would be interesting.

Third—There has been within the last year among the bee-keeping fraternity considerable dispute in regard to whether bees can store honey in artificial faster than in natural comb, and the opinion has been about equally divided. In order to determine the question for this region, we selected four colonies of bees, their condition being as nearly alike as possible, and gave two of them artificial and the others natural comb, with the following results:

DATE.	No. of Colony	Kind of Comb.	Commenced Storing.	Start in to Seal.	Ripe.
June 25.....	9	Artificial	July 3	July 27	Aug. 6
.....	12	Artificial	July 5	July 25	Aug. 8
.....	7	Natural	June 28	July 30	Aug. 11
.....	13	Natural	June 30	Aug. 4	Aug. 15

The above table shows that the honey made on artificial comb was ripe and ready to take off from three to seven days earlier than that made on the natural, although the bees began storing in the natural sooner than in the artificial. Of course, we tried this experiment on a small scale, owing to the limited number

of colonies, but, with our last year's experience, we are satisfied that bees can store honey faster in the artificial comb.

As bees gather honey from flowers it is really no honey at all; you may call it sweetened water or nectar. In order to make this nectar into honey it has to be evaporated to the right consistency. Bees working on artificial comb will raise the cells a very little when they will put in a drop of this thin honey, and if you will note a frame filled with a full sheet of foundation in a heavy honey flow, you will find that the cells are a little more than full of this sweetened water. In this condition the air coming in contact with the surface of every cell evaporates its contents to the proper consistency, when the bees will raise the cell walls a little more and put in another drop of nectar, and continue in this manner until the combs are completed and the honey is ripe, ready to seal. With the natural comb this evaporating process goes on much slower as the cell walls are already raised to their proper size, and the air sent in by the bees from the entrance cannot reach this little drop of honey placed in the bottom of these cells, evaporation goes on slower and the ripening process is retarded. Honey ripens in this country (owing to the dry atmosphere) much faster than it does in a damper climate, and for extracting, honey stored on foundation can with safety be taken off when completed and the bees start to seal up the cells.

Fourth—In order to keep up the working quality of our bees and at the same time improve them, it is just as necessary for us to change our queens as it is for a breeder to bring new and purer blood into the herd to produce finer and better animals.

We purchased two Italian queens from A. I. Root,

Medina, Ohio, which were received in good order. They proved to be excellent, and superior to anything we had. Their progeny are large, bright, well-marked bees, docile and good workers, and as the origin of our old queens was doubtful, their progeny small and not evenly marked, our first step in improvement of our stock was to replace our old queens with those produced by the pure Italian, that is, to Italianize our colonies. This we did in the following manner:

In the first place we stimulated the two Italian queens by liberal feeding to their full laying capacity, which resulted in all the combs being filled with eggs and brood; we were also particular to place several frames containing drone comb in each colony, for we needed young drones raised from the Italians to mate with our young queens, in order to get pure blood. Then we examined the other colonies, cut away all the drone comb to avoid the hatching of drones raised from the old queens, for if any of these should hatch and mate with our pure Italians, our labor would all have been lost. We performed this operation every two weeks.

The two colonies containing our pure Italian queens were increasing fast, the combs were filled with brood in all stages of maturity and the weather being favorable it was safe for us to begin queen rearing. We selected two of the strongest old colonies, looked over the frames until we found the queens and killed them, then we lifted all the combs, shook the bees from them back into their hive. This operation we performed with our two Italian colonies, except that we were particular not to injure the queens. Then we exchanged the combs of our pure bred queens with those of our old, being particular to break them down wherever we could find fresh laid eggs, in order to insure the construction of many queen cells. These two colonies now being

queenless started in at once to rear a queen, and as all their brood came from our pure Italians we were sure of raising pure bred queens. In a week's time we had enough queen cells started to supply double the number of colonies we had. It takes 16 days for a queen to hatch from the egg, and as our queen cells were far enough advanced, it was time to start our nuclei. We took from each colony of bees two frames full of brood mostly hatching, with all the bees adhering to them, placed the same in each nucleus with a frame filled with artificial comb between them keeping the bees close for 24 hours; then we selected the largest and most perfect queen cells and inserted one in one of the combs of each nucleus. We had now plenty of pure drones hatching and on the wing, so that when our virgin queens should come forth to take their marriage flight they could mate with pure Italian drones.

On the 16th of May our young queens began to hatch, and on the 25th we had a laying Italian queen in nearly every nucleus. After getting rid of all our old queens and leaving these colonies queenless for 48 hours we united a nucleus with each one of these, so that we now have only pure Italian bees. The progeny of the young queens raised, so far as noted, are large, bright and well marked bees. We find that the safest and easiest method of introducing a queen to a colony of bees is by raising the same in a strong nucleus and then unite her with the colony. This is better done towards evening when the bees have ceased to fly. After giving them a thorough smoking, the bees, comb and hive are sprinkled with sweetened water, to which is added a few drops of oil of peppermint, as this destroys the original scent of the bees, and they will generally unite amicably. It is always advisable to keep a close watch, for sometimes bees will not take kindly to their queen. In attacking her they form a solid cluster

around her, which is called balling, and hold her there until she is dead. If this is the case the queen will have to be liberated at once, which is done by smoking the bees and putting the queen in a wire cage of cylindrical form, about one and one-half inches long by one-half inch in diameter, closed at the ends with wooden plugs. The cage is then suspended between two combs, the hive closed and left undisturbed for 24 hours. At the end of this time one plug is removed and replaced by a piece of comb containing honey; it is also a good idea to smear the queen with some of it. After the hive is closed the bees will at once clean up this comb and honey, liberate the queen at the same time and almost always take kindly to her. If the bees try to kill their queen it can be easily noticed by placing the ear close to the hive, when you will hear a peeping sound uttered by the queen, something like the faint cry of a chick before it breaks the shell.

Fifth—Inquiry has come to this Station during the summer in regard to the spraying of fruit trees in the spring with insecticides composed of London purple or Paris green, whether bees would gather honey from fruit blossoms so treated, and what the danger would be of the honey being poisoned and stored by the bees. In California and other great fruit raising States where insecticides have been used on fruit trees extensively for years, there is no case on record of honey being poisoned by the application, and furthermore the insecticides are never applied until the blossoms have gone and the fruit is setting. The chemical analysis failed to show the least trace of arsenic in several samples of pollen gathered and stored by the bees during the spraying of our fruit trees. There have been cases where bees have gathered honey from poisonous plants, of which the mountain laurel (*Kalmia latifolia*) is the most deadly. Bees will visit this plant, and honey gathered from the

same has been fatal to those who ate it. (Professor Cook, Manuel on Bee-Keeping, p. 285.) To satisfy ourselves a little more on this subject, we fed a colony of bees a syrup treated in the same proportion with London purple and Paris green as the mixture sprayed on our fruit trees. We first placed the syrup containing London purple in a glass feeder before them. They started eagerly to take the sweet, but we very soon noticed that they ran aimlessly around the feeder and their eagerness to take the syrup ceased entirely. Some of the bees showed symptoms of poisoning and were dying. We picked several bees out of the feeder that we noticed were sipping the syrup, and placed the same under a glass; some were dead in 30 minutes, while others lived about four hours. We left this mixture before the bees 24 hours, and the syrup taken was hardly perceptible. The result with Paris green was the same. We now gave the bees the same amount of pure syrup, which they gathered and stored in about two hours. The chemical analysis did not show any arsenic in the syrup stored, while there were traces of the poison in the dead bees.

Sixth—One of the greatest problems with which the apiarist has to contend is the successful wintering of bees. Colonies placed in winter quarters with full stores and plenty of bees in the fall, being in the best possible condition to stand a long siege of severe winter weather, would come out in the spring few in numbers, starved and diseased. The discussions on the subject have been many and we are glad to say progress is being made toward answering this difficult question.

The methods of wintering bees are varied and many, and each has its advocates. Some winter bees on their summer stands without protection, others in cellars made for that purpose, while others bury them;

but the wintering of bees on their summer stands in chaff hives is the favorite method to-day.

For this climate we think it the proper way of wintering, but the question arises how can we avoid consuming so much honey. We generally have many nice warm days during the winter, in fact we have whole weeks of warm, sunny weather, when the bees will fly freely, and the consequence is, that a great amount of honey is consumed. Before it is safe to feed and bees can gather anew, their stores are consumed. If bees could be kept during the winter at an even temperature of about 45 degrees, until the steady warm weather of spring, with two or three short, warm spells, so they could have a fly, the risk of wintering bees would be reduced to a minimum.

All our colonies but three are packed in chaff hives on their summer stands. We have a record of the weight and condition of each one, and will try to regulate the temperature in different ways, and report results at a later day.

Respectfully submitted,

CHAS. M. BROSE,

Assistant co Horticulturist.

REPORT OF THE

SAN LUIS VALLEY

Agricultural Experiment Station.

To the Executive Committee, State Board of Agricuture:

SIRS—I herewith submit for your consideration the following report of work performed at the San Luis Valley Station since assuming charge.

The following is the list:

First—Material obtained and stable built.

Second—Hauling of implements, etc., to the Station.

Third—Cleaning up the premises.

Fourth—Forty acres leveled and prepared for irrigation.

Fifth—Observations taken for a system of irrigation for the farm.

Sixth—Two hundred and eighty acres of lateral ditch completed and 300 rods more partially completed.

Seventh—Twelve acres plowed.

There is herewith submitted an inventory of property belonging to this station. Work is being pushed with the end in view of having the farm in readiness for the planting.

Not having been asked by the Director as to suggestions for lines of experiments for the Station, refrain from making any.

Respectfully submitted,

H. H. GRIFFIN

REPORT OF THE

Bent Agricultural Experiment Station

To the Executive Committee, State Board of Agriculture:

SIRS:—Through the President, I have the honor to submit the following report of the Bent Agricultural Experiment Station:

Work was commenced on the above named Station September 17th, 1888, since which time improvements, including house, cellar, outbuildings and fences have been added to the place at a cost of about $700.

Rocky Ford Experiment Farm is located one and a fourth miles from Rocky Ford, and comprises 200 acres of land traversed by two county roads and the main line of the A., T. & S. F. railroad.

Situated seventy-five miles from the mountains, near the Arkansas river, in latitude 38 degrees, at an altitude of 4,000 feet, this locality presents many points at variance with the best known particulars regarding Colorado's climate, soil and possibilities.

It is a climate of meagre rainfall and light snows, with frequent winds in spring and fall, occasional hot winds in summer, and long periods of clear, warm weather, causing very rapid diminution of moisture from soil and atmosphere, consequently increasing the wants of plant life for water, and rendering doubly important

a full and thorough system of irrigation in the successful following of agricultural pursuits.

The soil is of an alluvial nature, somewhat largely composed of an admixture of fine sand and clay, known as adobe, usually rather light; in most cases, without any hardpan immediately below surface soil. In other places on the same tract will be found a solid clay hardpan. The top soil on all land belonging to the Station is light and sandy, and with the exception of a few spots having hardpan as mentioned above, the soil is porous and easily permeable to a depth of at least ten feet below the surface, showing that surface moisture will be diminished rapidly both from above by evaporation and from below by percolation, a further indication of the necessity of a plentiful water supply for frequent irrigation, while, in addition, it is evident from the uniform slope of the land and the depth of porous soil, that a very small portion, if any, of the farm will stand in need of drainage.

During the process of irrigation, owing to the fact that the Arkansas river water is heavily laden with particles of soil, a heavy deposit of sediment is given to the soil, and if undisturbed, this deposit settles very compactly, becoming when dry quite hard and almost impenetrable to vegetable growth.

To so distribute water in irrigation that this sedimentary deposit will not choke out or seriously impede plants in their growth, and to cultivate in such time and manner that this alluvial matter may be assimilated in the soil and become an enriching constituent thereto, will be not the least important matter for consideration at this Station.

As has been intimated, the Experiment Farm at Rocky Ford is well adapted for irrigation and landscape gardening.

The farm, as a whole, lies slightly dipping to the north and east, and at nearly every point water may be run in two directions without serious impediment, so that any desired system of platting may be followed with a certainty that the running of water will be easily accomplished.

One hundred and sixty acres of the farm is as yet unbroken sod, the remaining forty acre tract, however, was cropped, not cultivated, the past season, and though left in very rough condition, owing to bad ditching, etc., it may, by leveling and proper treatment, be brought into excellent condition for use the coming season.

From observations made, it is my opinion that special experiments in the following lines would produce valuable results for next year:

FIELD EXPERIMENTS—GRAINS.

CORN.

First—Best variety for general planting.

Second—Best mode of planting for general use.

Third—When to commence watering, how much and how often.

Fourth—How often to cultivate; how soon after irrigation.

WHEAT AND OATS.

First—Irrigation immediately before or after seeding.

Second—Adaptability of soil to each.

GRASSES.

First—Sowing and irrigation of timothy, redtop and red clover.

Second—Trial of tame grasses for pasturage.

POTATOES.

First—Testing varieties.

Second—Deep or shallow planting.

Third—Surface or furrow irrigation.

Fourth—Manner and depth of cultivation, how soon after irrigation, and to what stage of growth continued.

GARDEN CULTURE.

First—The setting out of fruit trees, vines, shrubs and plants indigeneous to the climate, their cultivation, irrigation and winter care.

TOBACCO.

First—Testing varieties.

Second—Best modes of planting and cultivation.

INSECTS.

An especially thorough observation of insect pests relative to their extermination.

Including report of progress on work of Station, the above is respectfully submitaed.

FRANK WATROUS,

In Charge.

REPORT OF THE

SPECIAL COMMITTEE

TO EXAMINE THE WORK OF

EXPERIMENT STATION.

"*To the State Board of Agriculture:*

"GENTLEMEN—At the request of the Board, the undersigned were appointed a committee from the respective organizations hereinafter named, and of which they are members, to inspect and report upon the work and management of the Experiment Station, conducted in connection with the State Agricultural College.

"At the request of the Secretary of the Board, the Committee met at the College on the 13th of November, 1888, and made a careful examination of the proposed line of experiments and the work that had been done during the season of 1888, and beg leave to submit the following report:

"We find, upon examination of the proposed line of experiments in all the sections of the Station, both scientific and popular, that they are of a practical character and cannot fail, if properly carried out, to be of decided benefit to the State, and we heartily approve the same.

"This being the first year of work of the Station under the National law, the results are all that could reasonably be expected, taking into consideration the adverse circumstances under which the same has been conducted.

"We desire to commend especially the experiment with tobacco, which has been carried out so successfully by the Horticultural Department. It appears, from results obtained, that tobacco culture is destined to become one of the leading industries of the State, and this demonstration alone is worth the entire cost of the Station for the past year.

"We would recommend that steps be taken as soon as convenient to inaugurate a series of feeding experiments with cattle, which, taken in connection with the analyses of the food value of our forage plants, would be of immense importance to the cattle industry of the State. Every provision should be made whereby accuracy and certainty would be attained in such a line of experiments, and we earnestly request the Board to take immediate action upon the same.

"We are of the opinion that analyses of the different soils on the farm and garden should be made, and a careful study made of the use of fertilizers in the growing of all kinds of farm and garden crops. We suggest this on account of the peculiar character of the soil on the college grounds, it being stubborn clay soil in many places, and not susceptible to easy and successful cultivation.

"We would further recommend that an investigation be made in reference to discovering a grass that will make a permanent pasture without irrigation.

"Owing to the many duties imposed upon the professor in charge of the horticultural section, we would suggest that an additional assistant be given him, and

such laborers as will relieve him of too much attention to the manual labor of the section.

"We have examined the books and vouchers of the treasurer kept in connection with the Station fund, and desire to commend the same for the thorough and business-like methods employed.

Very respectfully submitted,

JOHN L. ROUTT,
Colorado Cattle Growers' Association.

C. S. FAUROT,
State Horticultural Society.

ELWOOD EASLEY,
State Grange.

THE STATE AGRICULTURAL COLLEGE,
FORT COLLINS, COLO., November 14, 1888.

The State Agricultural College.

The Agricultural Experiment Station Department.

TREASURER'S REPORT.

Treasurer's financial statement for the fiscal year, ending June 30, 1888:

RECEIPTS.

Received from United States Treasurer		$15,000 00

DISBURSEMENTS.

Salaries of officers, professors and assistants	$ 3,115 01	
Services Ex. Com. and Board in charge	190 08	
Employes and labor	615 89	
Stationery, typewriter, postage and supplies	272 93	
Horticultural section, seeds, implements, team and supplies	1,416 85	
Agricultural section, seeds, implements and supplies	616 59	
Divide agricultural experiment station, lease	33 00	
Library account	1,009 70	
Chemical section, chemicals and supplies	2,321 37	
Printing bulletins	74 00	
Water assessment	18 00	
Meteorological section, apparatus	998 37	
San Luis Valley experiment station:		
Building account	605 00	
Plowing, fencing and construction of lateral	1,281 45	
Station laboratory	2,395 00	
Cash on hand to balance, June 30, 1888	36 76	
Totals	$15,000 00	$15,000 00

Respectfully submitted,

FRANK J. ANNIS,

Treasurer.

The undersigned have examined carefully the books and vouchers of the station treasurer, and find the same correct and in accordance with the foregoing statement; that said treasurer holds properly approved and receipted vouchers for all disbursements.

JOHN J. RYAN,
W. F. WATROUS,
Finance Committee.

THE STATE AGRICULTURAL COLLEGE,
FORT COLLINS, December 31, 1888.

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